DÆDALUS

Proceedings of the American Academy of Arts and Sciences

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Foreword

THE TWO HUNDRED and fiftieth anniversary of the birth of Benjamin Franklin was celebrated by the Academy in a variety of ways. The most permanent contribution was the publication of *The New England Courant. A Selection of Certain Issues Containing Writings of Benjamin Franklin or Published by Him During His Brother's Imprisonment.* As the *Courant,* which contains his earliest writings and was his only significant activity during his early years in Boston, is one of the scarcest of colonial newspapers, it seemed singularly appropriate for a learned society based in Boston to give it a wider distribution on this anniversary. The Massachusetts Historical Society generously permitted the reproduction in collotype, from their almost complete and nearly unique file of the *New England Courant,* of fifty-six issues. The selection was made by Professor Perry Miller, who wrote an introduction to the edition, which was published in January 1956. Copies of this small folio, containing 120 pages of facsimiles, are still available at ten dollars each.

Although this issue of *Dædalus* contains President Burchard's Valedictory delivered on 10 April 1957, Terence Millin's Amory Lecture and the texts of addresses delivered before other learned bodies by our Fellows Judge Medina and Chiang Yee, a considerable part of it is devoted to recording the ephemeral aspects of the Academy's Franklin celebration. The records of the one thousand three hundred and eighty-seventh and the one thousand three hundred and ninetieth meetings (pages 253-257) give the outline, while Morris Bishop's witty paper read at the former (pages 214-230) and E. Power Biggs's communication to the latter (pages 231-241) are printed in full. No formal record, however, can convey the charm and skill of Mr. Biggs's performance at the April meeting, which was built around a glass armonica that had been especially constructed for the occasion. The Academy's committee on the anniversary, consisting of Harlow Shapley as chairman, with Messrs. Biggs, I. Bernard Cohen, Henry G. Houghton, David McCord, and the Editor as members, hankered to hear the sound of Mozart's music on a glass armonica of Franklin's design. Franklin had played the musical glasses in their simple form, touching the bowls directly, but in his correspondence it is evident that he was interested in the addition of

a keyboard. Moreover, a keyboard appeared to be essential for the performances of the Adagios that Mozart wrote for the glass armonica. To satisfy this curiosity, the Corning Company undertook the glass blowing, the Buffalo organ builder Herman Schlicker made himself responsible for the construction of the keyboard mechanism and the cabinet, while the Franklin Savings Bank of Boston very generously footed the bill. Mr. Biggs, as the *deus ex machina* of the entire project, worked heroically and tirelessly for hundreds of hours to have the instrument ready for the April meeting.

In introducing him on that occasion, President Burchard referred to the difficulties of reconciling the tempo of experiment with the deadline of a concert. "Since I am not one who holds an unqualified view that the world steadily progresses in all directions, I have found perhaps an ironic consolation in the difficulties I have noted when the twentieth century girded its loins to reproduce something the eighteenth century apparently had tossed off. A little learning may be a dangerous thing; once in a while too much knowledge makes things difficult too.

"Mr. Biggs's report indicates most of the problems that arose, problems of the composition of the glass, of how to set it vibrating, of how to get it vibrating fast enough so that music of any speed could be played. He has not indicated how, as we introduced various modern elements, the instrument stretched and stretched, much like one of the incarnations of Alice, until it is much longer than Franklin's original machine. We stood in a position where we had to decide between a playable replica and a visual replica, and in this position felt we had to decide for the playable one.

"But we also had our glass breakings, though none so spectacular as the ones described in Mr. Biggs's communication. We broke a number of glasses – never, I believe, by such crude methods as dropping them or having trucks run off the road en route to Boston from Buffalo. On the contrary, they have broken at the swelling of a shaft, at the touch of a caliper, and most often through self-excitation – sometimes in their euphoria at sounding out so clear they vibrated themselves into bits.

"Thus we passed from crisis to crisis. A few weeks ago we were faced with a very serious decision. The Corning furnaces were shutting down. Not all the glass bowls were satisfactory. There was little likelihood that we would be able to get a full set of replacements if the breakage continued. We wanted many blown again that they

might nest more closely and thus reduce the length to the compass of the handsome replica case that Mr. Schlicker was building for us. We considered postponing the concert until next autumn. But finally we decided we must go ahead. There was little likelihood that we could again assemble such a distinguished company of musicians. The Franklin-Mozart year would be waning while now it was in its spring. We concluded that it was better to bring before you a demonstration of work in progress than to wait for a perfection that we might not even then achieve. Thus we put together the glasses in the elongated form inevitable at this point in our development and housed them in a temporary case, the one you see, and not the elegant device that Mr. Schlicker hopes eventually to build.

"We comfort ourselves with the conviction that as scholars the Fellows of the Academy are quite as interested in work in progress as in final results."

It must be confessed in all honesty that the tones of the reconstructed instrument hardly approached Franklin's description of "incomparably sweet beyond those of any other." Before seating himself at the keyboard, Mr. Biggs had most skilfully played with his fingers on the rims of wine glasses a Chinese Entrance Hymn for the Emperor of 1000 B.C., an English round, "My Dame hath a lame tame crane," and an eighteenth-century minuet, explaining that "with a musical glass the player goes round and round, but in the armonica the glasses go round and round." This simpler form of the musical glasses left nothing to be desired. The songs by our Fellow Roland Hayes and the playing by our Fellow Richard Burgin and a group of his associates from the Boston Symphony Orchestra more than compensated for the unseemly squawks of the "reconstruction in progress." The experimental method does not always work, but we had at least tried, and a thousand people seemed wholeheartedly to enjoy the experiment.

WALTER MUIR WHITEHILL
EDITOR

Imperium Sine Fine

Presidential Valedictory Delivered at the One Thousand Three Hundred and Ninety-Eighth Meeting of the Academy on 10 April 1957

JOHN E. BURCHARD

When he took office on October 11, 1944, President Howard Mumford Jones, reviving an ancient custom, delivered a Presidential address. This address has lost little of its luster with time. More than a decade later most of the questions there raised remain unanswered by our Academy; most of the provocative proposals have had but a partial response.

The custom has lapsed. It is the privilege of each President to chart his own course in this matter. My own choice not to make an inaugural address was prompted by the fact that I was very new to the Academy and had little sense for what the main questions might be. Now that I have been for three years your President and am about to retire, I may not be much better prepared. Nonetheless I do have some observations to make and you are entitled to some accounting of my stewardship. The accounting and the observations can conveniently be combined.

In his inaugural address, Mr. Jones remarked that the problems of our Academy were perennial. "The only novelty in successive decades," he said, "is the varying emphasis with which they press upon us for solution." The problems remain the same. What should be our policy in the election of Members? What are our purposes anyway? Can we state them more clearly? Should we have a "constructive" program and work steadily on it? Are we out of date and should we disband?

Though very few Fellows would say "yes" to the last question, and though even the few who occasionally might say "yes" do not in the end resign, it seems clear from the Presidential Chair that the Academy means significantly different things to different Fellows. To some it is principally the honor of membership. Though we often say to each other that this honor is not material, the fact remains that it is judged highly throughout the world. Every year we elect a few

Foreign Honorary Members of the utmost distinction; every year we select from the whole nation Fellows of the greatest of talent. The number of times such an election is declined has been negligible. A Le Corbusier who hates Academies and is often suspicious of America and Americans accepts an election to our Academy; a Schweitzer writes in distress because his slow mails may have made him too late to accept election and we happily extend the dates. These events are not insignificant and we ought to drop the pose that it is no honor to be elected to this organization. It is and it will remain so, as long as we exercise some discrimination in our elections. Moreover, the selection of new Fellows is of major interest to our membership. Every year more than 40 per cent send back appraisal lists.

But we are rightly not content to operate a moribund and antique society in which election to the Fellowship is an honor and not a duty, or even one in which the honor is the most important thing. We restlessly seek through meetings, through participation in programs of foreign intercourse, through social gatherings to produce various other kinds of results. In this restlessness we are a little like the Athenians as they were described by the Corinthians in the Congress of the Peloponnesian Confederacy at Sparta. Perhaps we have not been quite enough like them.

For some of us the most important work of the Academy is in the giving of awards for merit, for some the granting of financial aids to scholarship, for some the entertainment of foreign scholars, for some the learned communications, for some the occasional conferences on large subjects, for some the reporting of such events as they appear in our publications, for some the actions we infrequently take in matters of national concern, for some the fellowship surrounding our meetings and quite independent of the communications at those meetings, and for some the symbol of a club house, whether or not it is ever visited. No one of us probably would recall the Academy in all of these terms, yet each of them has significance to some of us. There seems to be no single image of the Academy held generally throughout the Fellowship although we do not know since we have never yet sought a Foundation grant for a self-study. Because there is no single image, it is hard, perhaps impossible, to establish a firm set of commitments, even perhaps an absolutely firm course. Our navigation tends to carry us across many seas with no particular port ever in mind. We are still a brilliant example of *laissez faire* and we seem to have remained so through a succession of presidents, despite

the fact that each president in turn may have exhorted us to a more directed conduct.

Let me deal now with a number of specific activities, one by one. I must start with the most spectacular one, the one which has called forth the loudest applause and criticism of this administration. Nearly three years ago the Academy was offered an interesting house in Mount Vernon Street, together with a capital sum to maintain it. It had many qualities which our Newbury Street House did not have and it lacked certain facilities to which we had become accustomed at Newbury Street. Parenthetically, I must remark that there can be no perfect house for an Academy which cannot define its major objectives, and that measuring any house by another house to which one is habituated, instead of measuring it in terms of its own potentials, will lead almost inevitably to a policy of never moving. This may in the modern world have connotations that are by no means complimentary. At any rate we considered this generous offer and declined it.

The principal effect of the offer was, it seems to me, to open the eyes of the Council to the fact that perhaps the Academy might sometime want to move. Previously this may not have been considered as very probable or even possible. Also it may have suggested that an institution like the Academy might, if it desired, be offered a number of houses by distinguished and generous citizens of Boston. All this paved the way for the next and critical decision.

Fifty-one years after the site for the Newbury Street House had been purchased, 43 years after the House had been occupied, your Council voted unanimously to sell it. The income from the sale was placed in the Agassiz Fund, and its approximately $200,000 value has since been growing by cumulated interest on prudent investment.

There has been no action of the Council, at least in my experience, which has provoked so much discussion. Many of you were in disagreement with the decision and have not hesitated to tell us so. More seem to have been pleased. A few of you, regardless of your opinion of the merits of the transaction, were disturbed at the way it had been executed. You said that the Council had no right to make such a decision for the Academy. Generally you did not go on to say how it should have been made. Should it have been done by the small proportion of the members present at a given meeting, less well informed than the Council and hardly more representative? Should it have been done by a letter ballot of all the Fellows with the obvious

note that the way the question would be presented to the Fellows could have a great effect upon how they would vote? What are the Constitutional powers of the Council?

Two questions arise then about the sale of the House. First, was it a good idea at all? There seems to be no merit in spending any time in debating this question since the sale cannot be revoked. But even if the event had not had the happy outcome that we can now celebrate, I would stand by the original position that the Council had been thoughtful in the matter and that it had made the right decision.

The other question is more troublesome and needs to be resolved by the Academy. As the Constitution and By-Laws now read, I have no doubt that the Council acted legally in making the decision about the sale. The question is not, it seems to me, one of law but one of the proper relations of the Council to the Fellows. I shall bring this question up again in a far more thorny context later. For the moment let me say that if any substantial number of Fellows are concerned to limit the powers of the Council in such matters, they ought to make proposals for Amendment of the By-Laws to make them suitably restrictive. Merely to do this, however, will not be constructive. If the Council ought not to act with power in matters where decision is necessary and must be reasonably prompt, it will not help the Academy merely to limit the powers of the only body which can so act. None of our critics has proposed any other mechanism and, without it, to tie the hands of the Council might doom us to lethargy in matters where lethargy is not desirable. I myself when I cease being an officer shall be content with the present situation, and I do not feel in the least defensive about our actions. The Fellows should, however, consider this matter and should either modify our rules or refrain from complaining when the Council acts, as now it must.

The sale of the House put us rather literally on the street. Through the generosity of Massachusetts Institute of Technology we found offices readily enough for our administrative staff. We established a fine committee to seek new quarters under the chairmanship of Harlow Shapley.

Mr. Land has recently called my attention to some ways in which this search resembled the very interesting description of how swarming bees find a new home. This has been most recently presented in a paper by Dr. Lindauer of the Zoological Institute of Munich, in the January 12 (1957) issue of *Nature*. It provides a rather complete

discussion of the ritual dance which the searchers perform in order to influence the bees who have been waiting for a report on the search. We have had the searchers out, and there have been ritual dances of varying degrees of intensity. None has been more intense than those of this varying evening. Note one more thing about the bees, though, which we may emulate. After the dances are done and the decision taken, they swarm *together*.

During the two years since we have been homeless, three distinguished houses have come within our ken. Each had merits far beyond those of the Newbury Street House in some particulars. Each in some ways did not provide things that the Newbury Street House had provided. In the end some of these apparent possibilities did not prove to be possible, but the evidence of the two years was clear enough that the Academy could and would be offered distinguished houses and that sooner or later it would find the right one on the right terms. Now of course we are all aware that a wonderful one has been found and that it will have its own effect upon our future career.[1] I draw from this not only a lesson about Houses. I think also we can conclude that if the Academy has purposes of meaning to the Greater Boston Community it can expect other kinds of support, far in excess of what it has ever sought, and perhaps ever deserved. Bostonians are seldom flamboyant or reckless in their giving and the gifts will need to be deserved by the purposes they will serve.

Even before the sale of the House we had been thinking of a new publication program. A committee under the chairmanship of Mr. Jones laid out a program in the spring of 1954 and it began to be carried out under the editorship of Mr. Whitehill. The committee report recommended that the *Bulletin* format be changed and limited to ephemeral material, such as announcements and notices. It recommended that the *Proceedings* seek papers of wide interest among the membership, that the format be improved, that the statutory requirements on publishing the records be abolished, that the new *Proceed-*

[1] The Fellows of the Academy, meeting on 10 April 1957, endorsed the previous vote of the Council accepting the invitation of the Brandegee Charitable Foundation to occupy as its headquarters Faulkner Farm, 280 Newton Street, Brookline 46, Massachusetts, which was until her death on 28 August 1956 the home of the late Mrs. Edward D. Brandegee. This three-story brick house, on a hillside not far from the Arnold Arboretum, was designed some sixty years ago by the late Herbert Browne of the Boston firm of Little and Browne. The terraced formal gardens at Faulkner Farm were an early work of the landscape architect Charles Platt.

ings be sent automatically to all Fellows, that the journal become a quarterly to interest a growing list of outside subscribers among intellectual leaders. The plan was to produce from two to four issues of about 96 pages each year, the first issue to appear in June of 1955. The plan was to subsidize the new publication over a short period of years, after which it was expected that it would so have made its way that Foundation support or outside subscriptions or advertising, or all three together, would make our main periodical an influential and self-supporting force in American intellectual matters. It was believed then, and I certainly still believe, that there is no first-class journal of this type in our country today; it was believed, and I certainly still believe, that the Fellowship of the Academy can provide a stable of writers equal to none in the country. In the time that has elapsed Mr. Whitehill and Mr. Ruzicka have developed an exceedingly handsome format for our new *Dædalus*, and the Editor has published two interesting issues. But Mr. Whitehill, who has worked hard and unselfishly on this project, and with very little assistance, would be the first to agree that *Dædalus* has not yet come to the standard of the aspirations I have stated. We have not given him enough money, we have not given him enough help. We should not expect to construct such a journal merely from the gleanings from papers which happen to have been read at Academy meetings – papers incidentally which were put on the program by a meetings committee and not by the editorship of the journal. We should not expect an editor to succeed without paid assistance. We should not expect our Fellows of the Academy in this modern world to contribute serious articles, breaking new ground, for no stipend whatever when they can obtain stipends wherever they may turn. A certain amount of generosity toward our society can be expected from those who reap the glory of being officers; we should not expect all the contributors to our journals, busy men who can sell all their time somewhere, to give us some of their best writing for nothing.

It is pretty clear to me that the Academy can make its mark on the whole nation or even the world principally by its publication. This is the only contact we have with more than half of our Fellows, who do not live near to us; and perhaps even with a half of those who do live near but are not in the habit of coming to meetings. Finally, of course, there is the vast number of other intelligent people who cannot be Fellows and with whom this can be our only serious communication. I have no doubt that we ought to gamble an adequate

amount of capital funds for a three-year period so that the Editor of *Dædalus* can make the most imaginative effort possible to make our journal one of the most significant in the world of educated men; that we should then take stock and either change our course or set out to establish a sound non-deficit financing for a demonstrated success.

Meanwhile the situation is not entirely favorable. It has not been possible to publish *Dædalus* at the rate of even one issue a year. The publication of the *Proceedings* during the last three years came to a total of 512 pages at an average cost of about $26 a page, while in the three years before the new policy was introduced we published 1,369 pages at an average cost of $17 per page. Due to inflationary trends the cost change is not significant. But the number of pages may be. If we omit from both periods the pages devoted to records of the Academy, then we published 112 pages a year during the current period, while we published 362 pages a year in the previous period. This raises a double problem. Instead of increasing, our outside subscriptions are falling off. Our non-resident Fellows, instead of getting about 300 pages of *Proceedings* for nothing, are paying $5 a year for about 100 pages of *Proceedings*.

If *Dædalus* is to succeed it must now be moved aggressively into a much larger effort and this is in my view one of the two principal challenges facing the Academy today and the most urgent one.

There have been a number of other publications in which we may take pride. There was the facsimile edition of the *New-England Courant* in connection with the 250th anniversary of Benjamin Franklin. We shall soon publish a manuscript by John P. Monks on the war experience of Harvard students as a volume in the Memoirs series.

We have published the second volume of *The Survey of Slavic Civilization*, "The Slavs, Their Early History and Civilization," by Francis Dvornik. Indirectly we are responsible for the book on Atmospheric Research which will be published by The Technology Press from papers delivered at our January 11 symposium in honor of Franklin. *Validation of Scientific Theories*, edited by Philipp Frank, was published in January, 1957, having emanated from the conference of the same name sponsored by the Academy in 1953 with the collaboration of the Institute for the Unity of Science, the American Association for the Advancement of Science, and with the support of the National Science Foundation. Papers are in publication for a book on *Science and the Modern World View* arising

from our conference on the same subject held May 5 and 6, 1956. Further publications on relation of the scientific enterprise to other aspects of society will be forthcoming from the research conducted under Philipp Frank with support from the National Science Foundation. Finally, as a result of a project undertaken by the Academy in 1953, under the chairmanship of I. B. Cohen and dealing with the activities of the Federal Government in science, A. Hunter Dupree, director of the project, has published a volume on this topic with the Harvard University Press. This kind of publication stems naturally from various conferences and research projects we sponsor and we can be proud of the quality of the record over the years. It is possible that we ought to be more active in these areas in future and that our two central interests in publication should be a vigorous *Dædalus* and a series of books reporting vigorous conferences on topics of cross-disciplinary interest. Indeed it is possible that the two should be combined and that the main fires for *Dædalus* should come from such sources.

Our research activities, our special conferences, and our monthly meetings therefore furnish the bone and sinew of our publications whether in books or in *Dædalus*. It is probable that *Dædalus* should be wider ranging than this and promote, if you like, its own conferences even if these take place only on its printed pages. I am fairly certain that a conference of the type run so successfully by Mr. Holton last year on Science and the Modern World View should appear as a fairly regular event on our annual agenda. That conference was particularly exciting. It was attended by some 250 invited scholars of a very high average talent and reputation and about 84 Fellows were present. Those who were not missed a powerful stimulus. Because of its success I have appointed two committees, each of which is likely in time to provide an important conference, the Committee on the Role of Science in Liberal Education and the Committee on the Unity of Learning.

If we should aim at at least one powerful conference a year on a suitable interdisciplinary topic, we should also in my opinion be more aggressive in seeking funds for the support of certain kinds of cross-disciplinary research which we could very well manage. As things are now, such projects are frequently brought to the individual universities of this community, from which we draw so much of our membership, and the individual universities often discharge the tasks very well indeed. But there are many such joint efforts

which might equally well and perhaps in some cases might even better be managed by the Academy. Here we must face the blunt fact that at the present time it would not occur to anyone with research funds to spend on any kind of an action project that any American academy would be a suitable manager of the study. Yet our Academy does have this latent competence. To do this kind of work we ought to be able to mobilize resources as quickly and effectively as the individual universities can. If this is impossible we should not seek such opportunities. But it is a matter which can well stand serious consideration.

As to our regular meetings, I can only report that they have followed the usual pattern in recent decades so far as the general character of themes and speakers was concerned. But they have been different in two significant ways. Beginning in the second year of my three-year term, our meetings were held not in the House of the Academy where they had been held for 40 years, but in various halls of the town, at the Museum of Science, at Harvard, Massachusetts Institute of Technology, Tufts. Yet to the confusion of the doom preachers the attendance at meetings increased over the three years preceding by 37 per cent; 22 per cent increase in Fellows, 48 per cent for guests. Moreover, the attendance bore no obvious relation whatever to the convenience of location; sometimes I regret to say it seemed to bear no obvious relation either to the apparent interest of the communication.

From this I draw certain conclusions. I think we must not underrate in the future the importance to many of our Fellows of the social cocktail hour and the buffet, or of the imported beer and cheese which follow the regular meetings. In his Inaugural, President Jones deprecated the purely social attributes of the Academy and in this he was, perhaps, betraying a fundamentally Puritan background which influences so many of us. The fact may well be that many of us, all busy, and all perhaps too proud of being busy, considering busyness as synonymous with virtue, do indeed covet the free association with our Fellows which can occur at cocktails, at dinner, and at postprandial beer; but we cannot quite bring ourselves to admit this, so we must have a pretext in the shape of a communication which justifies our seriousness of purpose in having attended.

Yet in a world as complicated and specialized as ours, it is wrong to deprecate too much the virtues of some intellectual leisure. Indeed it is not at all sure that many ideas of the utmost professional im-

portance are not given birth on such occasions. At the same time, we must recognize that a truly cross-disciplinary occasion is hard to come by. The specialist who will almost certainly be our speaker is given an impossible assignment to steer between the Scylla of his fellow-experts, whom he must not bore, and the Charybdis of his other colleagues, whom he must not confuse or bewilder. It takes a great man to steer this course successfully and there have not been eight successful runs each year.

This sets me to wondering whether the pattern of our meetings should not be studied; whether for example there might not be a number of Class meetings dealing with quite professional matters, occasional meetings in which we dealt as Fellows with perplexing problems that are common to us all – as the problem of visas was and may be again – and possibly in addition several more frankly social affairs, including one annual "bust" of the scale of the special celebration of the 250th Anniversary of the birth of Benjamin Franklin, when we had such a pleasant dinner and such amusing addresses and such a grand concert and were hosts incidentally to about 1,100 people. Surely an imaginative Fellowship could, year in, year out, conjure up a suitable pretext for such an occasion.

After the question of where we shall reside has been answered, and after we have developed a vibrant publications and conference and research and meetings program, another matter of the greatest interest is that of our interference in social and political matters.

First, for the record, I must state that during this administration, we have made a number of such interventions on various scales of importance.

On December 22, 1954, the Council approved the principle of the Beacon Hill preservation bill which was before the Massachusetts General Court. In May, 1955, the President was instructed by the Council to write to the Secretary of State protesting the refusal of the United States to support action in the United Nations for calendar reform. Most recently we made a statement concerning the Hungarian refugees which you will all remember. On another occasion, a letter was addressed to Senators Bridges and Wiley in the name of the Council expressing concern over the action of the House in cutting appropriations supporting the international exchange programs of the government. Perhaps, however, the most important intervention of this sort occurred in 1955. Senator Lehman had suggested to us that we might wish to testify before the Senate Judiciary

Subcommittee on Immigration and Naturalization concerning the relation of these laws to science and scholarship. The Council considered this and instructed the President to appear at the hearings to express the concern of the Academy that the well-being of the arts and sciences in America should be fostered by reducing to a minimum the restrictions on visits of foreign scholars, and the President did so appear.

Now there was little doubt that this action was on the whole well received and there were very few (though there were some) Fellows who did not favor the position the Council had taken. But again the question did arise whether the Council should have taken it. After the merits of the position had been admitted, the question still remained. It had two facets. The less important was that a tax-exempt institution risks its tax exemption if it intervenes very often in political matters. How great the risk is probably is a question of how much of the total activity of the institution is so directed and perhaps quite as much of the climate of opinion at the time. In a bad climate a relentless persecutor of an institution such as ours might make difficulties on slight provocation. We took due account of the problem here raised, and assisted by Mr. Katz and other eminent jurists among our Fellows, concluded that in each situation the Academy would have to determine the wise and honorable course, knowing the possibility that under some circumstances others might raise the question whether our action did not constitute a trespass of this rather uncertain boundary. Indeed, the Council decided, and it is fairly sure it has your approval, that there were times when such risks should and must be taken.

But there is a more profound question which we have not resolved and this is the relation of the Academy to its individual Fellows. It is by no means likely that on any issue of major importance the Fellows should be unanimous as to the right. Has a mere majority of the Fellows, much less has a representative Council, the right to make any statement on any matter of this sort on behalf of the Academy? When it does so, does it not prejudice the position of the Fellow who happens to disagree with the statement? Can any disclaimer that the statement makes in any way protect the right of the dissenting Fellow in such a situation? To be sure he has the Lockeian right of the individual to secede from the Fellowship. But will such a resignation in fact atone for the harm which may have been done him by his previous association with a position of which he dis-

approves? And even if this right of secession is all the protection he needs, what are the proper procedures for the Council and the Fellows to take in determining when to say anything and what to say on each such occasion?

I cannot overstress the importance I attach to this issue. We live in a strange world of organizations in which most individuals of the highest intellectual talents, save perhaps painters and poets and other free artists, are attached to some organization or other, and indeed usually to a large organization. Organizations are more and more coming to feel that they cannot have positions on any controversial matter. But no individual who has risen to any prominence in an organization can express an opinion either; for he has no effective way of divorcing himself from the organization when he expresses such an opinion. Indeed some of the prestige of his opinion rests upon the very fact that he is not an anonymous and obscure man but, on the contrary, a man of importance as evidenced by the importance of his role in his institution. Very few people in the world are so famous any longer that they do not need identification when they stand before the public and ask to be heard and believed.

But by this process we are slowly arriving at a situation in the United States where most of the men of repute are deprived of the privilege of molding public opinion unless they are personally in politics or happen to be free lancers. The irresponsible people of the community can say anything, the responsible ones must be mute. Jointly signed letters to *The New York Times* are not very effective. No one can in the end believe that there are not situations in which an organization such as ours has a power and a responsibility which it must take seriously.

I would contend that we have not taken that power and responsibility seriously enough. We stood idly by while the inquisitors roamed the land and we can take no credit for their ultimate decline. Similar attitudes toward totalitarian growths as adopted by fellow-scholars in other lands have not turned out happily.

I am not proud of the Academy's record in these matters. I am proud of the one stand we did take on the matter of the visas and less so of the caution we exercised in talking about the Hungarians. I think we should be more vigilant and more vocal. Indeed in the present state of affairs it may be that only organizations such as ours can have such a voice; there are many practical reasons why it cannot be lifted by corporations or by labor unions or by universities. The

risks of taxes we would probably all gladly run when the stakes were high. But the other problem of how we can take positions and behave equitably to all our colleagues in our Fellowship is thorny. I believe it an important item on our future agenda that this be worked out fully and clearly and in such a way that we need not always be mute.

These seem to be the main matters of concern. We have continued to give awards and often substantial ones to highly meritorious people. We could profitably be more assiduous in this and to be so we need more funds. Certainly the recognition of excellence is, as Lord Adrian said to the American Philosophical Society about a year ago, one of the most important activities of a Society such as ours. Our Rumford Premium and Amory Prizes have international recognition. We are unbalanced in our ability to give awards among our Fellows. We have just introduced an Emerson-Thoreau award in literature thanks to the initial generosity of Mr. Haskins. We need to augment this with funds so that the prize may have substantive as well as honorific implications. We need a comparable award in the social sciences; and ultimately, perhaps, many more. We should move actively to secure funds for various awards in enough fields so that it is clear that we are an Academy of Arts as well as an Academy of Sciences. We all know this. The world which reads only of our awards would not.

Thanks to the brilliant management of Mr. Ford, who left office in 1955 after many years (our funds had increased from $365,000 when he took office, in 1938, to over a million in 1955), and that of his successor as Treasurer, Mr. Adams, I can report on leaving my chair that the finances of the Academy have never been in better shape. We must, however, be daring in our use of some of our accumulated surpluses as venture funds if we are to be what we may be and if we are to attract more funds to our support. We should gamble on *Dædalus*. We should leave no stone unturned to make good on the challenge put to us by the generous arrangements made with us by the Brandegee Charitable Foundation. If we can make our journal first-class and if by our actions in the new house we can stimulate the whole community, then we need have no fear that generous support will not be forthcoming, far beyond anything we might now imagine.

This brings me to the final question on which I would like to comment, the matter of membership. During this administration the election has proceeded at about a standard pace. In the first two

years, 165 were elected, as compared with the 182 for the previous two years, a slightly more selective choice, but still perhaps not selective enough. The resignations per year were 3, as compared with an average of 4.65 over the previous 20 years; the declinations of election averaged 2 a year, as against an earlier average of 3.1. The age and distribution of members among sections and geographically did not appreciably change. We continued not to have any firm and fast membership policy and perhaps this is just as well, though if that is our wish it should be a matter of design and not of accident. Shortly after taking office, I appointed a special sub-committee of the Committee on Membership and there were many subsequent discussions looking toward a firmer policy on elections. We now really have three different standards. However, no substantial changes have come about and I am now convinced that this is in general wise. We have introduced some fruitful changes in the way of finding proposals for new members. Among other things, I wrote to 264 selected Fellows whom I happened to know pretty well and who were widespread geographically and asked them for suggestions as to new Fellows; 98 replied, sending 450 suggestions and affording what I am sure is the largest and probably the best slate produced for the Academy in recent years. This list was considered by the Membership Committee along with their own suggestions. There will remain for some years a considerable pool of suggestions from which to draw proposed new members. This kind of inquiry cannot profitably be made every year, but might be repeated perhaps in every fifth year.

It does seem to me, however, that we might reconsider our distribution quotas, which weight the scale in favor of the physical sciences represented by Classes I and II. This is not, let me hasten to say, because I believe that the Humanistic Class should be expanded. But it is possible that if the Academy is to become the vital force it may be in our community, we may be too heavily laden with scholars of all types as opposed to other kinds of intellectuals, whether they be creative artists, in which we are really in short supply on our rosters, though we have many critics, but also doctors, men at the bar, and above all, perhaps, men from the commercial and industrial and political worlds. Scholars need to communicate with one another and this is certainly one of the reasons our Academy must have meaning; but they need also, and even more desperately, to communicate with other intelligent people, for we must not fall into the trap of

concluding that only scholars are intelligent. We should reconsider this matter of balance, always bearing in mind a statement made, I think by President Bowditch, of which Mr. Wilson has frequently reminded me, to the effect that we should not elect too many professors for they would ruin the Academy. We have elected a great many professors, perhaps not too many professors, but certainly not enough other people.

I cannot take leave of you without expressing my gratitude to you for conferring upon me the honor you have in causing me to be your President for the last three years. No one can sit in the Presidential Chair and contemplate the roster of those who have preceded him without a sense of awe and inferiority, and this has not escaped me. But no one who is human could also forego a jubilant thought that, for a moment at least, he had been allowed to be listed in such company. You have been tolerant of my eccentricities, cooperative to the extreme in everything with which you have been asked to help. It has been for me a happy if frantic time, and of course it is not the least of the happiness that we have come finally to port in a House which I can view with enthusiasm.

If we exploit our new House to the hilt, if we develop the brilliant publication we should, if we regularly run important conferences on topics of the widest importance and interest, if we manage more research, if we increase the number and scope of our awards for merit and if we are bold in our public pronouncements at the times when we should be bold, there will be no reason for our successors to be anything but proud of the actions of those generations of the Academy now living. But above all, our successes in these matters will depend upon a continuously vital membership. President Jones said many important things in his Inaugural Address, but nothing more important than this: "Neither the President, nor the Council, nor the whole administrative body of the organization can work out a destiny worthy of our pretensions, unless the lively and continuing interest of a great majority of the Fellows is awakened."

We have now the opportunity in the new House to awaken this interest in a way we never had before. This is what I meant when, in my letter about the House, I said that if we undertook to use it we would be undertaking a moral rather than an economic obligation. Among the many who answered, only one professed not to understand what I meant. When so many have understood I can have little doubt of what the outcome will be.

At the May meeting I shall pay you a brief farewell and compliment you upon the election of my distinguished successor. But that will be brief and in family terms and this is therefore my valedictory. Now that you have decided to accept the new House, I can give a title to my address which I had previously thought must be kept to myself. It is *The Empire without Limits* and it comes from a tired, but really never tired, set of lines in the first Book of the *Aeneid*. Here Jupiter says to the Roman people: "His ego nec metas rerum nec tempora pono; Imperium sine fine dedi."

> "For them I set no boundaries of circumstance or time,
> I have given them an empire without limits."

Man, Beast, and Field

Some Influences of the Francis Amory Prize Researches

An Amory Lecture Delivered at the One Thousand Three Hundred and Eighty-Fourth Meeting of the Academy on 5 October 1955

TERENCE MILLIN, F.R.C.S.

MY FIRST pleasure as spokesman for the Francis Amory prizemen for 1955 is the expression of the appreciation, not only of myself, but of all my colleagues, to the Council of the Academy for conferring this distinction upon us. Those honored by you this year consist of four most eminent research workers – those brainy "back-room boys" of Medicine–, two clinical workers in the specialty of urologic surgery, and one outstanding representative of that most necessary ancillary corps which devises and constructs the intricate and delicate instruments we one and all require for our work. Before giving you a résumé of the accomplishments of these prize winners, I feel that as a priority I must give you a reason for my choice of what must seem to many of you a curious title for an address on such an occasion.

My distinguished predecessor as communicant seven years ago, Dr. Charles Huggins, chose as the title of his address "The Medical Significance of the Amory Prize Researches" and dealt most lucidly and interestingly with that aspect. As a surgeon with some farming interests (and what Irishman has not a love of the good earth in his bones?), I have had the urge, I hope not unfittingly, to extend the scope of this address this evening and wander a little through the wider realms of Nature. I shall endeavor to show you that the work of some, at least, of the men you are honoring today, and have honored in the past, in addition to aiding in the alleviation of the sufferings to which human flesh is heir, and elucidating the functioning of Man – that most wonderfully and fearfully made machine–, has made most valuable contributions to the health of the beast of the field and the plants that encompass the earth; yes, even to the health of the

soil to which, as many believe, we must ultimately look if we are to make a large-scale advance in preventive medicine. We should all aim at the prevention of disease and not assume that disease is inevitably with us and bend our efforts only to therapeutics. Whether we are disciples of the pessimistic Malthus and foresee inevitable disaster, believing that the good earth is incapable of supporting the teeming millions which will inhabit this planet within a short span of years, widespread war and pestilence excluded, or whether we remain optimistic that scientific achievements will keep pace with the increments of population, the undisputed fact stands forth that we must increase the staple diet of the world, both in quantity and in quality; there must be available, with a more equable distribution, more animal protein, obtained from the beast of the field; more carbohydrates, the wheat of the occident and the rice of the orient. The duty, then, as I see it, of the medical research worker is not merely to help the ministration of the sick by additions to therapeutics, but to go further and give aids to preventive medicine, which must surely be intimately concerned with the health of the soil and its products, animal and vegetable.

With these points in mind, I shall seek to bring to your notice a few facts which will indicate, as I hope, that the best type of medical research is universal, not merely in a geographical sense, but ecologically; that is to say, it is dealing with the delicate balance of all living things on this planet. I shall hope that you will feel that the Amory prizemen have not lagged behind in the scientific achievements of this exciting age.

Turning now to those whom you have thought fit to honor on this occasion, I recall that my predecessor seven years ago remarked that it was an easy assignment to discuss the work of his fellow prize winners. To me the task this year is formidable. The mysteries of steroid chemistry and the like, about which much of the important work of my research colleagues has centered, is well-nigh a closed book for such a simple soul as a mere urologic surgeon. My terms of reference for this address are that it should have a broad appeal to men of learning in the various arts and sciences (a tall order!); I am assuming that there are amongst you others equally unversed as I in advanced chemistry, a cogent excuse for avoiding undue technicality. I take this opportunity of apologizing if I do not convey to the full the intricate detail and beautiful reasoning which have gone into the work of my research colleagues – work which has gone

far toward revealing many of the mysteries concerning the functioning of the reproductive organs and the allied endocrine glands.

All these research men are outstanding workers in the field of physiology – that science which probes the working of the animal corporate. Their work, though in some respects in different spheres, has all related to the functioning of the gonads – those factories of the seed of life–, a problem of vast complexity. It has necessitated far-reaching studies into the hormones produced by all the endocrine glands, which exert such a powerful influence on the true glands of reproduction, governing their secretory activity and the fecundity of their products. Studies throughout the length and breadth of the animal kingdom have been necessary; the lowly earthworm, the duck-billed platypus, even the sea urchin, have come under scrutiny and had the innermost secrets of their sex life exposed to the arc lights of the laboratory.

Very briefly may I remind you of some of the accomplishments of these research men you are honoring here this evening.

Dr. Li, professor of biochemistry and experimental endocrinology at the University of California, is one of the most distinguished biochemists of this age. He did much to elucidate the formation of the intermediates of thyroid hormones and then, with his colleague H. M. Evans, succeeded in isolating somatotropin, the growth hormone of the anterior pituitary. Continuing these studies, he investigated, with his brilliant team, the lactogenic hormone of the pituitary and isolated the important follicle-stimulating hormone from the same gland. During the past few years, he has made major contributions to the biochemistry of the adreno-corticotropic hormone, happily shortened to ACTH, that powerful therapeutic agent which has brought relief to thousands of sufferers in a variety of disorders formerly resistant to treatment. These truly represent great contributions of outstanding merit.

Dr. Thaddeus Mann, biochemist and medical man, has been associated for many years with the Molteno Institute at the University of Cambridge. Up to 1944 his investigations were concerned largely with enzymic studies, mainly of the metallo-protein group of enzymes. He was responsible, with Keilin, for the crystallization of hemocuprein, a copper protein present in human and animal blood, and for the discovery that zinc forms part of yet another enzyme, the so-called carbonic anhydrase, which is concerned with the carbon dioxide transport in blood.

Since 1944 Dr. Mann has turned his attention to the physiology and biochemistry of reproduction. In the course of his studies in this field, some in collaboration with his wife, Cecilia Lutwak-Mann, also a distinguished biochemist, he has made important contributions elucidating for the first time the metabolic processes in mammalian sperm. It was in the course of this work that he discovered and isolated from semen a sugar, fructose, which is found in varying concentration in animal and human semen. He has further shown that fructose is formed in the seminal vesicles, the male accessory glands of reproduction, and that the process of fructose secretion by these glands is under the control of the male sex hormone. He also demonstrated that spermatozoa are capable of utilizing fructose and that this metabolic reaction, called fructolysis, provides the energy for sperm movement.

In addition to being reader in the University of Cambridge, Dr. Mann is director of an active group of research workers who form the Unit of Reproductive Physiology and Biochemistry recently established in Cambridge by the British Agricultural Research Council. Members of this unit have made important contributions to our knowledge of semen storage and mammalian ovum physiology, and I shall have occasion to refer to some of their work later in this paper.

Dr. Warren Nelson, professor of anatomy in the University of Iowa, is another distinguished endocrinologist, whose contributions on lactation, the pituitary gland, and cancer of the breast have been outstanding. He is at present a consultant of the Public Health Service of the United States. He has studied extensively the endocrine function of the testes and the male sex hormones and factors controlling their production, as a result of which he has done much to increase our knowledge in this important field. His wide investigations of testicular biopsies laid the foundation for a classification of disorders of these organs. It is now possible to recognize more clearly two main groups of male hypogonadism: a primary type, which is the result of a defect in the testis itself, and a secondary type, due to inadequate stimulation of the testis by pituitary gonadotropins.

Thanks largely to the work of Dr. Nelson with his morphologic studies on the testes in various stages of development and in various phases of health and disease, particularly by testicular biopsy, our knowledge of spermatogenesis has vastly increased and efforts are now being widely made to help with endocrine therapy certain as-

pects of subfertility – a subject which is of great sociologic importance in that the childless marriage may so often become the broken marriage.

Dr. Lawson Wilkins, professor of pediatrics at Johns Hopkins University and virtually the first pediatrician to give endocrinology serious thought, has made important contributions to the study of sex differentiation. He has primarily concerned his studies with the earlier, indeed the earliest, phases. Sex is not just a simple question of male and female. The husband produces from his testes not only the sperms with which he fertilizes his wife's ovum, not only the male hormone which endows him with the virility which attracts his wife toward him, but also, surprisingly, some ovarian hormones akin to her own. The wife also has her male qualities. Her ovaries secrete something very like male hormone. Dr. Wilkins has chased sex even farther back – into the womb. He has brought to notice a most important condition, congenital adrenal hyperplasia. In this, children destined to be girls are masculinized in early stages of intra-uterine life. Dr. Wilkins has shown that, by the use of cortisone, this malevolent intention of the fetal adrenal cortex can be combatted. Cortisone prevents masculinization and can feminize even 18-year-old virilized females. Another condition studied by Dr. Wilkins is the so-called ovarian agenesis, as a result of which "girls" grow up stunted, without breast or sexual hair development and without menstruation. It has recently been discovered that the sex chromosomes of these "girls" are really male and that if the sex glands atrophy before sex differentiation takes place, at about the seventh week of intra-uterine life, the embryo, destined by its chromosomes to become a boy, is born with the genital tract of a girl and the individual is, in fact, regarded as a girl throughout life.

The outstanding and indeed most exciting discovery which has been made in recent years in the field of medicine is that certain malignant tumors of the reproductive organs, evidenced in the prostate gland and breast, are controllable by hormones. For the first time, cancer has been influenced for the better by medical therapy. Until this epoch-making discovery, largely brought to fruition by the Gutmanns of New York and Huggins of Chicago, whom you very properly honored here seven years ago, malignant tumors could be influenced only by radical surgery or by exposure to radioactive emanations. The last septennium has seen this work advanced largely through the contributions of at least two of this year's prizemen, who

isolated and established the chemistry of hormonal substances influencing the adrenal cortex.

May I briefly review the fascinating story leading up to the hormonal control of cancer? William Harvey, the great English physiologist of the sixteenth century, who wrote what has been termed the most important book in the history of medicine, recognized an association between the testis and the prostate gland. He had observed an atrophy in both these glands in the hibernating hedgehog. During the nineteenth century castration was practiced on a number of occasions for prostatic cancer, largely empirically. The probable reason for the procedure's falling into dissuetude was that the operation was more frequently employed for simple hypertrophy of the gland, for which the results are rarely satisfactory. It remained for Huggins to apply modern knowledge to explain the rationale of castration and estrogen administration in the treatment of cancer of the prostate. He based his deductions on a long series of studies on the prostate of the dog, showing that the glandular tissue of the prostate was under the influence of androgens – that is, male sex hormones – and that increased prostatic activity was associated with increased production of acid phosphatase. Administration of androgens to men suffering from cancer of the prostate stimulated the tumor to grow, with a rise in the acid serum phosphatase level, whereas removal of the testes or administration of the female hormone, estrogen, frequently led to a retrogression of the tumor. Castration, however, does not remove all sources of androgen production; this may explain why some patients did not respond satisfactorily to castration or relapsed after initial benefit. The adrenals are also a source of androgens. It was logical, then, for Huggins to suggest bilateral total removal of the adrenals. Unfortunately, this was impracticable, as death would inevitably follow such an extirpation, owing to the loss of other essential hormones, unless some adequate substitution endocrine therapy, necessary to support life, were evolved. Such was the position seven years ago on the occasion of the last Amory awards. Thanks to the work of many indefatigable research men, amongst them several of this year's prizemen, these life-giving hormones elaborated in the adrenal cortex were identified and their chemistry studied. This work gave us cortisone and its allied substance hydrocortisone, administration of which now enables us to remove entirely the adrenal glands, with betterment of the plight of those suffering from certain advanced cancers. Yet a further step has been planned, and

indeed practiced. I refer to the removal of the pituitary, that little gland at the base of the brain which might be said to be the master gland. Certainly by its manufacture of ACTH, a hormonal substance which activates the adrenal cortex, it must have a great part to play in androgen production, and the late results of its removal are being anxiously awaited. Lest I may have given the impression that by these surgical operations, aided by substitution therapy, we can now cure all cancers of the prostate, let me say at once that this is not so. At best, we can claim that for the first time we can slow down these malignancies and so prolong life, often for several years – you will agree a worth-while achievement.

There is still another malignancy which is amenable to hormone therapy. I refer to certain breast cancers. In 1896 Sir George Beatson, in Glasgow, removed both ovaries in a young woman with recurrent mammary cancer following radical extirpation. Eight months later all traces of the malignancy were said to have disappeared. In 1900 Boyd published the first series of 54 cases so treated. Other series followed, and, rather strangely, for on the whole the results were encouraging, by 1905 the method had fallen into disfavor. Perhaps this was the result of a celebrated lawsuit in which a patient who was not suffering from cancer of the breast claimed damages from a surgeon for removing both her ovaries. In 1935 Haddow, in London, showed that certain carcinogenic hydrocarbons possessing some estrogenic activity retarded the growth of malignant tissues. It is only during the past few years that hormone therapy either by surgical castration or by exogenous administration has been re-employed.

This development of hormone therapy is fascinating when one recollects that only a very few years ago an eminent internist remarked that "hormones are administered to credulous patients by even more credulous physicians."

It is obvious that a vast amount of work remains to be done on this subject of the interrelationship of malignancy and the sex hormones. The present tendency is to attribute the effect of gonadal hormones to their ability to change the endogenous environment: In prostatic cancer administration of estrogens or castration alters the predominantly androgenic background; in female breast cancer androgens may change the estrogenic environment during the premenopausal years and androgens or estrogens may upset the "neuter" environment of the postmenopausal woman. It may be that the therapeutic hormone is effective by actually creating hormonal imbalance. We

leave the point with two queries. Do hormones cause cancer? Do hormones cure cancer? Perhaps on the occasion of the next awards the answers may be known.

Boston is some 3,000 miles from London, as members of a learned society must be well aware; some 7,500 miles farther on in a southeasterly direction lies the ancient and celebrated town of Malacca, surrounded by the dense tropical jungle of Malaya. It was there, as I lay sweltering in that torrid clime after having carried out a prostate operation on an elderly Chinese gentleman, that I heard the news that you had done me the honor of electing me one of this year's Amory prizemen. It is noteworthy that the diagnosis in this case was established by means of an instrument engineered by one of this year's prizemen, Mr. Frederick Wallace; the operation was one I myself introduced to the profession and for which you have most kindly honored me; the postoperative period was taken care of by utilizing one of the many devices created by yet a third prizeman, my good friend Dr. Fred Foley. A remarkable coincidence, you may say!

Dr. Foley of St. Paul truly represents a rare genius – an eminently practical and skillful surgeon who has been an ornament to our profession and particularly to the specialty to which we both belong; an engineering prodigy whose blueprints, whether they be for intricate optical instruments, surgical operating tables, or devices activated by compressed air, are accepted by the most meticulous of manufacturers without query. The name of Foley is writ indelibly across the pages of urologic lore. The Foley Y plasty for the correction of obstruction at the kidney outlet has saved many a kidney; nay, many a life. The Foley balloon catheter, another child of that fertile brain, is probably the most universally and frequently employed instrument in the whole field of urologic surgery today. I could continue at length with many other of Dr. Foley's contributions to genitourinary surgical practice but shall spare his blushes. Time, the great arbiter, will verify the unique place the well-beloved Foley of St. Paul has carved for himself in the annals of urologic surgery.

To Frederick J. Wallace the world owes much. He has by his veritable genius molded and augmented mightily the great organization brought into being by the immortal Reinhold Wappler, making it without doubt the most famous concern of its kind in the world. In his workshops are conceived and manufactured the most delicate optical and electrical equipment so essential in modern operating room and research laboratory. There must be few countries in the world

where his devices are not helping in the investigation, diagnosis, and treatment of human ills. Such are his scientific achievements; but, like so many great men, he is a humanitarian, the most modest, the most approachable, the most understanding of men. Our problems are his problems. Mr. Wallace, we salute you.

I should like now to turn to wider issues than the purely medical significance of the Amory Prize researches. It has been cynically averred recently that " scientists are, in general, illiterate, inarticulate and irresponsible. They cannot explain what they are doing nor why they are doing it and they have left their discoveries, like foundlings, on the doorstep of society. As well as being unable to communicate with the public, specialisation is such that they cannot even communicate with each other." There is undoubtedly a grain of truth in such a criticism, and somehow, if science and humanity are to progress together, we must get a more comprehensive synthesis of scientific knowledge.

" The birthright of all living things is health. This law is true of soil, plant, animal and man; the health of these four is one connected chain." So wrote the late Sir Albert Howard in his *Agricultural Testament*. Few will deny this, that the well-being of mankind is interdependent with that of the animal, the plant, and the living soil. The black death, the plague which ravaged England in 1348-49 and swept off more than one-third of the population, was preceded and followed, we are told, by disease in the livestock. Allbrecht has conceived life as a biotic pyramid with soil at the base, rising through microbic life, plant and animal, to man at the apex. He sees the struggle for life as the struggle for proteins. Carbohydrates build plant bulk, but neither they nor the fats carry the power to grow. Only the proteins can transmit life, propagate themselves, multiply themselves, and regenerate new cells by their own division. Life chemistry is carried on by means of the proteins. There are at last twenty-two known amino acids composing proteins. Only plants and bacteria can synthesize proteins from simple ingredients. Animals and man must assemble theirs from plants, other animals, or bacteria. Whether or not a plant contains the essential amino acids for animal nutrition depends on the balance of minerals and other fertility factors in the soil. Many claim that real fertility in the soil depends on humus. Liebig, the father of the artificial manuring of the soil, believed that chemists could give to the land what we removed from it in terms of nitrogen, phosphates, and potash. We now know that inorganic chemical substitution is

rarely sufficient, probably never wholly so, on a long-term policy; it represents but a temporary stimulus, an agricultural cocktail, as it were. The organic content must be maintained, whether inorganic fertilizers are used or not.

Human fertility, powerfully reinforced by medical science, is expanding world populations by some twenty-five millions every year. With a realization that in many parts of the world the productivity of the soil is declining, eminent students of the problems of nutrition have expressed grave concern, some even aligning themselves with the pessimistic doctrines of Malthus, and fail to see the survival of the race. There is certainly no doubt that survival of the human race in anything like its present population and rate of expansion depends on an adequate supply of nourishing food. That, in turn, depends primarily upon the cultivation and wise development of resources, the natural agencies whereby animal and vegetable life on this planet is perpetually renewed, thus providing a surplus of vitalized materials, over and above their own reproductive needs, for the sustenance of the human species. It is not men or machines that produce the seed grains, the fruits and the foliage, the flesh, the milk and the eggs upon which we live, but living plants and animals. These require for their growth and reproduction a fertile, that is, a living, soil.

Ecology, that attractive and relatively new subscience, may be defined as a study of a species in relation to its environment. Thor Heyerdahl has aptly defined the specialist as one who digs his own hole ever deeper for details, with more and more concentration; it appears to be the job of no one to sort out and try to piece together the stacks of excavated material. This sorting out can be guided by ecology.

This evening your Academy is paying tribute to a number of men who have made contributions to the welfare of the health of man. My thesis is not only that the Amory prize winners have made important additions to our knowledge of the function of man's body, the ailments to which it is heir, and the better treatment thereof, but that they have done more, namely have increased our knowledge for the betterment of the health of the animal, the plant, and the very soil of this planet, upon which our own health is ultimately dependent.

The organic farmer believes in prevention rather than cure and seeks to build up such conditions in the soil that crops may be truly healthy and resistant to disease. By feeding such crops to stock, and by sound management, most of the diseases which trouble farm stock, he believes, can be avoided. By organic farming is frequently

understood a vast amount of composting for incorporation with the soil and absolute avoidance of artificial fertilizers. Such are the practices of the extremists or fanatics, as some would have them, but it is possible to be an organic farmer without eschewing the advantages of periodic liming of the land or adding limited amounts of inorganic nitrogen, phosphates, and potash where deficiencies of these are obviously present. Organic farming, as I interpret it, and indeed practice it, implies keeping up the fertility of the soil by adequate humus replacement. It is possible to do this by appropriate green manuring combined as far as is economically possible with periodic additions of composted material activated by mixed animal excreta. Few believe that it is possible to maintain a healthy soil if one practices intensive crop growing without keeping up the humus content; very few are convinced that by avoiding all chemical fertilizers and adding large quantities of compost to the land it is possible to avoid disease in stock, as some would have us believe. More and more the importance of improving the texture of the soil, that is, its physical structure or crumb, is being realized. This process is certainly helped by organic additions properly worked into the soil. Composted material improves the texture and in addition, by virtue of its being derived from elsewhere – hedgerows, sewage residues, other fields of probably differing chemical constitution –, may restore a balance of the trace elements so necessary for all stock and indeed plant life. It is only relatively recently that the importance of these trace elements has been appreciated. The outbreaks of " swayback " amongst sheep in certain localities have been ascribed to a copper deficiency and may be prevented by incorporating traces of this element in the soil. The " pine " or lakeshore disease of the same stock arises from a cobalt lack. In some respects these conditions call to mind the goitrous diseases of the inhabitants of the iodine-deficient belts of the world. Composts of mixed origin would appear to offer a means of restoring a balance of chemical and microbic constituents to land and help in the production of a healthy soil, a potent step in preventive medicine. Let us not forget the experiences of many truck gardeners who, after a severe attack of disease in tomatoes and other crops, have grown similar crops the following year on the composted diseased haulms with conspicuous success and absence of disease – apparently another example of preventive medicine, this time in the vegetable kingdom.

As I mentioned earlier, several of this year's prize winners have done much to expand our knowledge of those chemical messengers,

the hormones, which have such a profound effect on the workings of our bodies. Hormones are not without importance also in plant life and indeed in the soil, with its teeming microbic population. Few gardeners today are unacquainted with plant hormones, auxins and the like, and what farmer utilizing the modern weed sprays does not know that these are basically growth-promoting hormones which so stimulate the noxious intruders in our crops that they literally outgrow their strength and so die or are checked in their development? It is now believed that substances derived from indole and produced in the gut of the animal are largely responsible for the growth of plant life. And so the cycle goes round. Aqueous extracts of organic matter in soils serve as growth hormones in the laboratory for test plants. Black currants and potatoes have been known to take up benzine-hexachlorate, and plant roots can take up indole. Indole, of course, is present in animal droppings. A derivative, indolacetic acid, is the plant hormone giving pronounced growth of roots and shoots. With little change by addition it becomes tryptophane, one of the important amino acids for the synthesis of protein.

The sex hormones, about which I have also spoken earlier, and on the elucidation of which several Amory prize winners have done so much, call for mention in modern farming practice. In the fattening of table poultry, caponization of the cockerel by implantation of the female sex hormone is widely used and leads to an earlier maturing with well-fleshed breast. It was feared by some that this practice might lead to unwanted side effects in humans indulging in a diet rich in this feminized poultry, for example impotence or infertility in the male, but these fears have proved unfounded. Work is also in progress to evaluate administration of the female hormone to fattening steers and hogs. There appears to be some evidence that such administration is of value, possibly accentuated by the concomitant administration of thyroid extract. Lest the criticism be leveled that such applications of animal research are merely for the commercialization of farming, it is appropriate to recollect that any improvement in the practice of husbandry must lead to a betterment and cheapening of the essential foodstuffs of the people. It must be the aim of farmers all over the world to provide more and more of the basic diet of better and better quality at a cheaper and cheaper price if we are to cater for a rapidly expanding population and indirectly thus to dispel the main cause of war, the desire for *Lebensraum*, asylum elsewhere for the masses unable to obtain a living in the homeland.

The most powerful therapeutic agents today are unquestionably the antibiotics – molds mainly of earthy origin. Their beneficent effect on the pathogenic organisms afflicting man and beast is common knowledge. Who can doubt but that they exert the same health-giving action on the myriad denizens of the soil? It has been suggested that the marked resistance to certain pests and diseases of plants grown on naturally fertile soil is due to absorption of antibiotics and other substances produced by soil organisms. It is but twenty-seven years ago that penicillin was accidentally discovered by the late Sir Alexander Fleming in a growth of mold in his London laboratory – an epoch-making discovery that was forgotten and rediscovered some fifteen years later during a crisis in man's struggle for survival. From this beginning has emerged the already considerable and rapidly increasing number of antibiotic substances now waging an ever-widening battle with the germs of disease. Waksman, Amory prize-man of 1948, has been one of the foremost pioneers in the isolation and development of these agents. The veterinarians have, of course, not been slow in availing themselves of these wonder drugs in the care of animal health, and many diseases of farm stock formerly regarded as lethal are now curable.

Since 1950 the value of certain antibiotics administered in well-nigh homeopathic doses – something of the order of five parts per million – in the food of fattening animals has been established. Hogs and poultry appear to respond most satisfactorily; there is a shortening of the period of maturation by about 10 per cent, and there is also an improved food conversion ratio. The precise *modus operandi* is, as far as I know, not fully understood. It would appear that the antibiotics counteract an antigrowth factor normally present in the gut of the animal; vitamin B_{12} should be available when antibiotics are administered. Here we may profitably pause and consider where the pigs of the past, like the Gadarene swine which roamed the plains, obtained their antibiotics and vitamins. Before the days of the cement and brick pig palaces of modern commercial farming, the swine, " the old ladies who paid the rent " as they were called in Ireland, roamed the countryside or had free range in the barnyard. Their long strong snouts rooted in the good earth and so obtained their terramycin or other available antibiotics and secured their vitamin B_{12} from the fresh droppings of cattle, who, by a merciful dispensation of Providence, manufacture this health-promoting substance in their rumen. The unthriftiness, or lack of resistance to infection, that frequently

follows confinement in the modern stye really represents a deficiency disease, proof of the old adage that one shouldn't get too far away from Nature and Nature's methods. Forget not the fresh limes of the English Elizabethan sailors that warded off the scurvy; we "limey" Britishers have not forgotten!

I hope that I have indicated to you earlier, particularly in speaking of the work of Dr. Mann, how much progress has been made in the realm of seminology. In farming practice much use has been made of our increased knowledge of the seed of life. It is now possible to store the seed from a sire almost indefinitely by utilizing low temperature techniques. Long after such a sire has passed from this worldly stage his seed may be fathering new offspring. In the past, many great animal breeders, embarking on what is essentially a long-term policy of line breeding and the like, found their efforts frustrated by the death of an important sire. By the preservation of the seed of such a sire in his prime, and great dilution of the spermatozoa is now found possible when appropriate nutrient media are utilized, the experiment can proceed even though the animal is long since dead. We can thus look forward confidently to improvement in all farm stock by long preservation of the seed from outstanding sires and from the fact that by artificial insemination we can fecundate a vastly greater number of females than could a sire by the natural method.

And what of the females? Here again the research men have shown us how to improve on Nature, or rather, to utilize to the full the gifts of a bountiful Nature. In the course of her productive period, every female produces far more eggs than are fertilized. Scientists have long been seeking to make fuller use of this egg production when dealing with dams of outstanding merit. It has proved feasible under laboratory conditions to recover such ova, implant them in dams commercially less valuable, and fertilize them by utilizing the seed of proved sires. In this way it is possible to produce pedigree offspring out of relatively valueless animals of the same species. The possibility of thus expanding the pedigree stock of the world, with its infinitely greater food conversion potentialities, is of absorbing interest. Some recent work from the Cambridge University research unit directed by Dr. Mann has carried the experiment a stage further. His associate, Mr. Rowson, has succeeded in transferring eggs from one species to another. Ova from sheep treated with follicle-stimulating hormone, isolated, incidentally, by this year's prize winner Dr. Li, and mated a few days before, were recovered and transferred to female rabbits

previously mated with a sterile buck. Five days later, the does were sacrificed and more than 50 per cent of the transferred eggs were recovered. Two of the eggs were then retransferred to a nonpregnant ewe in which ovulation had occurred a few days previously. The ewe was sacrificed sixteen days later and there were found two normal embryos resulting from the twice transferred eggs. This discovery may represent a valuable addition to present knowledge about ova transplantation. The corollary would appear to be that the reproductive tract of the rabbit can be used as an "incubator" to enable valuable sheep ova to be transported successfully over long distances. It is possible that developments of the technique might enable the ova of valuable cattle and mares to be similarly transported.

Several laboratory workers have succeeded in transferring fetuses from valuable cattle to commercial stock of the same species without loss of viability. If the procedure proved successful in a high proportion of cases it would be possible to obtain several offspring from a pedigree dam in one year by utilizing commercial stock as foster mothers. The prospects are fascinating.

In these days of great and fearful happenings, with wars and rumors of wars ever in our minds, with countless Jeremiahs prophesying cataclysmic events, it is satisfying to contemplate the grand achievements of the past and refreshing to ponder optimistically on the prospects of the future. Much has been achieved; much more remains to be done. It is not given to mortals to look into the future. We can but surmise, and it would not seem rash to forecast great developments in the realm of preventive medicine. Endocrinology has many secrets to unfold. Further appraisement of the roles played by the antibiotics in the microbiology of the soil, in the development and preservation of a healthy environment for the base of the pyramid of life on this planet, can be confidently expected. Further studies in the sphere of seminology will doubtless unlock many doors as yet unopened. What golden opportunities await the gifted men of vision and training.

A quotation from Rose's *Life of Napoleon* comes to mind: "After all, the verdict of mankind awards the highest distinction not to prudent mediocrity that shuns the chance of failure and leaves no lasting mark behind, but to the eager soul that grandly dares and mightily achieves."

Those of us who are being honored by your Academy today are not unmindful of the generosity and lofty ideals which inspired Francis Amory in his legacy to research. We must hope that by our

contributions we have achieved something to relieve the ills and to elucidate the cause of such ills in the field of human suffering in which our benefactor was interested and, further, to spread knowledge to wider spheres, whereby the beast of the field, the plant, and the soil of this planet, on which we are ultimately dependent, may be benefited.

A Liberal Education and the Advancement of American Freedom

Address at the 1955 Convocation of Trinity College, Hartford, Conn.

HAROLD R. MEDINA

IT IS a source of satisfaction and pride to me that I have been selected to address you on the interesting and important subject, "A Liberal Education and the Advancement of American Freedom." I would not have you think, however, that I have any special professional competence for the task in hand. What I shall say represents no more than the meditations of one who, trained in the beginning as a humanist, has had the sort of everyday experiences which most lawyers and judges meet in the course of busy, active lives. In other words, I am not a philosopher, although I wish I were. But a lot of ideas have been running around in the back of my head for some time, and I welcome this opportunity to pass them along to you, for what they may be worth.

By way of preliminary, I shall sketch a bit of background. When I was a freshman at Princeton it became plain to me that I was definitely a nonconformist. All the freshmen had to wear little black caps, corduroy trousers and other parts of an identical outfit, and we were all supposed to look alike and do the same things. I need not tell you that my nonconformity got me into a lot of trouble. I was the first man in the class to wear a mustache, and many efforts were made to remove it, in one way or another; without success, however, I am happy to say.

One of the instincts of the human race is its gregariousness, the herd instinct, and the majority, especially those in authority, always seem determined to make the rest conform to their notions of what is proper and fitting, down to the last detail. This has probably been going on since long before the time of the Egyptians. The emotional force behind the demand for conformity is fear. Consequently, in a period of crisis and rapid social change and adjustment, it becomes more and

more insistent. This sort of thing seems to operate in cycles. With the scientific developments and discoveries of recent years and the violent changes which necessarily follow the destructive and disintegrating forces of a great world war, we find ourselves today in one of the periods when, because of the intuitive and often unrealized fear of what the future may hold, the demand for conformity is widespread and powerful. Paradoxically, it is precisely in such critical times that to think clearly and avoid panicky, ill-conceived decisions is most important. We must remember that all life is a dichotomy, an unending series of choices between this and that.

Again by way of background: Largely but not wholly because of the deliberate efforts of our communist friends, the word "liberal" has taken on a sinister and evil connotation. The word seems almost to be taboo in polite society, as though a liberal, while perhaps not an out-and-out communist, were at least a "parlor pink" or a "fellow traveler," a bit inclined to be subversive if the opportunity presented itself, and a nasty, disagreeable sort of fellow.

Frankly, I resent all this. I was brought up to think that just about the best kind of a person to be or to be with was an honest-to-goodness liberal. I do not intend to be frightened away because the communists and their coadjutors have tried to appropriate the word "liberal," just as they have the names of our great presidents Abraham Lincoln and Thomas Jefferson, by the use of Aesopian language twisting names and personalities to suit their purposes. I know how they do it. When I presided over the trial of the eleven Communist leaders in 1949, at first I was puzzled by their constant talk about democracy and freedom, always of the Russian variety. It suddenly dawned on me that this was simply a clever piece of propaganda to make Marxism-Leninism more palatable to the American public. That is how the communists became liberals. Yet the word liberal fundamentally means free.

I do not care about the communists at the moment, however. Let them do as they please, and the politicians, too, who seem inclined to call themselves liberals when it serves their purposes. I consider myself a liberal; I should like to have you think of me as a liberal; and I hope I shall remain a liberal for the rest of my life.

What is a liberal? The answer may have some bearing upon what we mean by a liberal education. I shall give a few definitions of my own in preparation for what I have to say later.

In defining the terms "liberal," "conservative," "reactionary" and

"radical," dictionary meanings are of little assistance. These words have been so variously used in different contexts that the only generalization which can fairly be made respecting them is that the shades of meaning attributable to them are, in large measure, personal to the definer. For this reason, it is probably more useful and certainly more accurate to discuss these words in terms of their connotations.

And so I say, a liberal man must be a thinking man, one who has learned to evaluate his experience and the world about him independently and freely, using the ideas of others only as the starting points of his own analysis and creativity. But this does not complete the picture. The liberal not only has his own concepts of right and wrong, desirable and undesirable and so forth, but is always prepared to accept criticism and to try to understand opposing views. He constantly stands ready and is anxious to reappraise his own conclusions, ideas and concepts of truth in light of differing theories and new information available to him.

By way of a footnote here, I should like to remind you that this is precisely the way the communists talk. Woe to the individual, however, who fails to follow to the letter the official Communist line of the moment. He is forthwith excluded from the ranks of the elect.

The conservative differs from the liberal particularly in his reluctance to revise original estimates. He is not wholly without an inquiring mind and capacity for change, but he instinctively struggles against espousing new ideas and rejecting pre-existing notions of truth. In any appraisal in which he engages, he seems to bestow a quality of good upon that which exists or is current, merely because it happens to be the prevalent practice or view right now. As a consequence, a great deal more persuasive argument must be directed at him to induce any change or revision of the current norm. He is basically a follower in the day-to-day journal of progress and seems to rely more upon the support of general social acceptance than upon faith in his own convictions independently arrived at.

The reactionary is one who not only resists change but actively combats any deviation from the *status quo*. To this man, there is no reappraisal of existing ideas or concepts but, instead, an utter unwillingness to consider, much less accept, the merit or worthiness of any view differing from his own. Within the framework of the reactionary philosophy, change is inherently undesirable and reason plays little, if any, part in an appraisal of existing phenomena or new ideas. His is a static and perhaps even retrogressive concept of life and so-

ciety; his world is one composed of what has been and not of what will be or should be.

The radical is similar to the reactionary in his fanatic devotion to his own belief and his unwillingness to tolerate the view of others. However, where the reactionary decries change, the radical can see no merit in anything but violent deviation from traditional ideas. Rather than engaging in reasoned re-examination of prevailing views, the radical proceeds on the assumption that there is a positive quality in change merely for the sake of change and, correlatively, that the more emphatic the deviation from existing ideas, the more desirable the change. As is the case with the typical reactionary, the thought process of the radical is more often emotional than rational, and he has a signal intolerance of the views of others.

So much for background.

If we are to discuss the relationship between a liberal education on the one hand and the advancement of American freedom on the other, it is important that we should have a clear notion of what a liberal education is and what we mean by freedom. Unfortunately, these words have been so frequently bandied about that practically everyone takes them for granted and the average citizen goes his way without having the slightest notion of what they really mean. It would be a barren task were I to attempt to sketch the history of the education of free men from the time of the great cathedral schools and universities of the Middle Ages and the Renaissance, with a description of the trivium and the quadrivium and the various ways in which, over the centuries, man sought ever-increasing accretions to his knowledge of man and of the cosmos. It seems better to take stock of what are commonly accepted as the purposes and ends of a liberal education.

In the first place, I think we will all agree that at the top of the list comes training in the use of the mind. How often do we hear the expression " teaching someone how to think "! I well remember when I first learned to think. It was in my sophomore year at Princeton, and the man who taught me was Christian Gauss, then a teacher of Romance languages and one of Woodrow Wilson's " preceptor guys " at Princeton. How he did it, I shall never know. But suddenly I realized the difference between merely repeating the thoughts of others, including those of the college professors, and thinking for myself. Without some such beginning, there is no such thing as freedom.

In the second place, it is the function of a liberal education to fill its votaries with a burning zeal for the ascertainment of truth, the

whole truth, no matter where it leads or whom it hurts. Imbued with this spirit and determination, the seeker after truth finds the search unending. We go on and on, ever seeking to scale the heights and open up new vistas. Perhaps some of you will remember the words of Horace:

Audax omnia perpeti
gens humana ruit per vetitum nefas

"Bold to suffer every hardship, the human race rushes to its destruction in its effort to pierce the veil which hides what we are forbidden to know." It is always difficult to find a precise English equivalent for Horatian Latin; but his meaning is crystal clear. Without this ferment of curiosity and this indomitable will to know, how can there be freedom?

The third great object of a liberal education is more elusive, more difficult to define, and yet perhaps fully as important as the others. I shall have to beat about the bush a bit in order to communicate to you my thoughts on this subject.

Recently I was reading that extraordinary biography of Sir William Osler by Harvey Cushing, the famous brain surgeon. One of the most entertaining and enlightening features of the book is the quotation here and there of parts of the innumerable speeches and talks for which Osler was so justly praised. In one of these he was, as I recall, talking to some of the undergraduates at Yale and he got off on the subject of a liberal education. One of the purposes of a liberal education, he said, was the "teaching of good manners." What could he have meant by this? Surely not table manners or the protocol of the drawing room. What I think he meant was that one of the functions of a liberal education is to develop our inner resources so that each of us will find himself a satisfactory person with whom to live. Must we always be dependent upon the company of friends or acquaintances? Our minds are in a state of perpetual motion; we never stop thinking. What are we to think about? What sort of books are we to read? Do the subjects of religion and morals and ethics have any impact upon the development of our ideas and our capacities? Do we simply drift with the current of contemporary life or are we guided by some deep, consistent, well-defined purpose? That is just a flash in one direction.

Going off on a tangent, as it were, I wonder whether it is not a matter of prime importance that we form some warm and sympathetic notion of the dignity of man. Of other men, in general, not of

ourselves in particular. If we do this, will we not of necessity become more tolerant of the views of others and of their little whimsies or even of their sins? Good will is one of the most precious spiritual forces in existence. Will we not be happier, more useful men and women if subjection to the educational process of a liberal education trains us to a love of our fellow man?

Even in the bringing up of children, how important it is to realize that each little soul is the master of its own destiny and that steering each into the ways we think best may occasionally be no more than the manifestation of our own egotism to the detriment of the very person whom we are so eager to assist. I have seen the careers of young men all but ruined because a father or grandfather pushed into the law someone destined to be a poet or a musician, a business man or a philosopher.

The wonderful thing about the sort of liberal education of which I have been speaking is that it is so flexible. Over this great land of ours there are literally hundreds of colleges like Trinity which, free from state control or domination of any sort from without, pursue this quest in their several, separate ways. In some, mathematics is required through the senior year. In others, a majority of the students take Latin throughout their course. Despite all the clacking of the utilitarians, Greek is far from dead. Here and there the natural and applied sciences take precedence. In not a few the emphasis is on sociology, anthropology and psychology. And in all these liberal arts colleges we find an increasing interest in spiritual forces, in religion and in sound principles of morality. There is a pattern of no pattern. And I ask you whether this is not a healthy sign that the education of free men and women in America is in good hands.

Let me ask each of you this question. What voices speak to you, my friend? Are they from within? Or are they alien voices, not yours but those of someone else or of the world at large, guiding you hither and thither in the mist?

Perhaps now you will realize what I am about. I am painting a picture, planting seeds, trying to stimulate your imagination, and doing what I call preaching the gospel. You do not have to agree with me; but I warned you in the beginning that I wanted to get some things off my mind and that I had some merchandise to sell.

But how about freedom? What is freedom, anyway? To me freedom is a state of mind; it is a way of life. It is a concept, an idea, as slippery as an icy slope on a cold day and as changing as the iridescent

throat of a peacock. From one viewpoint it is the individual on the one hand and all the powers of government and the state and society on the other. How much individual freedom is consistent with the needs of a given nation or community at a given time? Freedom is the opposite of slavery; there is physical freedom and the freedom of the mind. Freedom is more precious than all the gold and all the jewels of the Indies. But it is not static; it is subject to the inexorable laws of growth and decay.

Not long ago Mrs. Medina and I had an exciting experience on Edward R. Murrow's "Person to Person" television program. Frankly, I did not know what we were in for. I thought there would be a rehearsal. But no; nothing like that. This man Murrow is a remarkable man. One of the questions he popped at me, out of the blue, was: "Judge, can you recommend some little book, of a hundred pages or so, which will explain all about this freedom business?" Well, that was a question! Freedom is the study of a lifetime. Our Bill of Rights, which looks so simple when we first read it in school, is a dynamic, flexible, ever-expanding and growing definition of our fundamental rights. Like the search for truth, the ultimate in freedom is always just over the horizon, just beyond our grasp. The trick is not to lose it, or any part of it, but rather to get as much more of it as we can assimilate.

And yet the temper of the times would seem to be in the opposite direction. In our zeal to defend ourselves against the onslaughts of the communists, we must be alert to the danger of adopting their ruthless methods and losing our freedoms in the process. It will not do merely to give lip service to the fundamental rights, as they do, whilst at the same time indulging in actions the inevitable consequence of which must be the erosion or whittling away of our heritage of freedom.

With the complexity of modern life, new problems arise. Old problems suddenly come out of the shadows and demand solution. New chapters will be written about Freedom of Speech, Freedom of Religion, Freedom of the Press, the Equal Protection of the Laws and all the other Freedoms so dear to our hearts. The rights of individuals must be expanded and implemented and clarified. And at the same time law observance and order must be maintained and malefactors and enemies of society justly punished. The Road to Freedom is a difficult road to follow, full of pitfalls and perplexities. Nothing worth while comes easily.

Let me see whether I can pull the threads together. First, let me add a few dabs of color to the canvas. Not long ago I was reading the diary of John Evelyn and I came to a description of his being taken to see a man put to the torture. The prisoner was charged as a pickpocket; the man whose pocket had been picked identified him, but the prisoner refused to admit his guilt. What he saw in the torture chamber was too much for worthy John's stomach and he declined an invitation to witness what was to be done to the next victim. But there is not a word of protest in the diary. He took it for granted that this was the thing to do, and it was the regular, lawful procedure.

John Evelyn was speaking in terms of about 1650. I have another picture in my mind, one that was a familiar sight a century or so earlier. A man, often bowed with years, is chained to a stake and around his neck are hung, also in chains, the books he has written. They are huge, bulky folios, not the sort of light literature we chiefly hear about today. And presently the fagots are lighted and the man is burned to death.

Going a century the other way, to 1750 or thereabouts, we find ourselves in an attic somewhere on the left bank in Paris. Three or five or sometimes even more than ten men are writing. They are making copies of one of Voltaire's latest pamphlets. It is too risky to have them printed. These copies go hither and yon like wildfire.

Such is conformity. These things happen when we encounter the antithesis of freedom; each of them is the product of tyranny of one kind or another. But they have all gone, blown away into oblivion by the winds of progress.

Our only hope today lies in the fostering of freedom. We must be fearless and tolerant and receptive of new ideas and new interpretations. What we all wish for is more freedom. Not freedom to do as we please, to the detriment of ourselves and our neighbors; but the freedom that comes with wisdom and enlightenment. I am thankful for the liberal arts college where free men are trained to think for themselves to the glory of God and the advancement of American freedom.

Franklin in France

Address at the One Thousand Three Hundred and Eighty-Seventh Meeting of the Academy on 10 January 1956

Morris Bishop

You take the Métro No. 6 to the Passy station, walk north a block, and turn west on the rue Raynouard, a narrow, angular street which still keeps the bony structure of a country road. You pass the Musée Balzac and stop to read a plaque marking the site of Franklin's home. It was a *pavillon*, or dependent house, in the gardens of the great château de Valentinois. The château belonged to Franklin's excellent friend, Le Ray de Chaumont, whose name is associated with the development of the north country of New York State.

In this *pavillon*, and occasionally in a wing of the château itself, Franklin lived from 1776 to 1785. He paid no rent, for Le Ray de Chaumont would not accept any tribute from his lodger, the gigantic symbol of liberty. Franklin's was a comfortable and happy house, ringed by a *terrasse* from which he had a noble view across the Seine. He saw the dome of the Invalides, the round towers of Saint-Sulpice, and in the distance the square towers of Notre-Dame. In the foreground stood an ominous scaffold, a lay *memento mori!* The Seine was three hundred yards down the hill. There, until he was nearly 80, Franklin gave his grandsons swimming lessons, racing them triumphantly across the river and back.

Here Franklin spent what were on the whole the happiest years of his life. He had the satisfaction of doing great historic deeds. As plenipotentiary to the Court of France he dealt with the highest matters, with the controllers of civilization's destinies. He arranged for French military and financial aid to our Revolution; he made the peace. He bought and sold ships and army supplies; he made treaties with European powers; he was the ministry of information, the commercial attaché, the cultural counselor, the legal department, the passport department, the *chef de protocole*. To do his world-shaking business, he had a staff consisting of his grandson William Temple Franklin, who was 16 years old in 1776; a French clerk, and an occasional

American assistant, who usually turned out to be a British spy. Perhaps there is a lesson here for our colossal Paris embassy, which extrudes, I suppose, two hundred pounds of interoffice memoranda daily.

He had the pleasure of imposing on the world his judgments, his prescriptions for the world's welfare. He had the pleasure also of receiving such adulation and adoration as few nonroyal mortals have enjoyed during their stay on earth. His friends, guests, intimates were the most brilliant intellectuals of a society of which intelligence was the particular mark. Voltaire, Buffon, Turgot, d'Alembert, Condorcet, Beaumarchais, Mirabeau, Du Pont de Nemours—I choose a few of the best-known names. Only two great French thinkers are absent—Rousseau, poor, jealous, half-mad Rousseau, and Diderot. Though Diderot admired Franklin, he never sought him out. I cannot imagine why. The two would have been congenial, their conversation memorable.

Franklin found the French immediately harmonious to his mind. He wrote to Josiah Quincy in 1779:

> I find them here a most amiable Nation to live with. The Spaniards are by common Opinion suppos'd to be cruel, the English proud, the Scotch insolent, the Dutch Avaricious, &c., but I think the French have no national Vice ascrib'd to them. They have some Frivolities, but they are harmless. To dress their Heads so that a Hat cannot be put on them, and then wear their Hats under their Arms, and to fill their Noses with Tobacco, may be called Follies, perhaps, but they are not Vices. They are only the effect of the Tyranny of Custom. In short, there is nothing wanting in the character of a Frenchman, that belongs to that of an agreeable and worthy Man.

For the stimulation of his mind, Franklin had the association of his intellectual peers. And for the solace of his heart, he had the gay affection of a galaxy of remarkable aristocratic women. The news of these amiable nymphs passed the Atlantic, and Franklin felt the need of placating sour American judgments. He wrote to his niece, Elizabeth Partridge of Boston:

> You mention the Kindness of the French Ladies to me. I must explain that matter. This is the civilest nation upon Earth. Your first Acquaintances endeavour to find out what you like, and they tell others. If 'tis understood that you like Mutton, dine where you will you find Mutton. Somebody, it seems, gave it out that I lov'd Ladies; and then everybody presented me their Ladies (or the Ladies presented themselves) to be *embrac'd*, that is to have their Necks kiss'd. For as to kissing of Lips or

Cheeks it is not the Mode here, the first is reckon'd rude, & the other may rub off the Paint. The French Ladies have however 1000 other ways of rendering themselves agreeable, by their various Attentions and Civilities, & their sensible Conversation. 'Tis a delightful People to live with.

Since it would be tiresome to record all the ladies who rendered Franklin their attentions and civilities, I shall notice only the two who occupied the chief place in his heart: Mme Helvétius and Mme Brillon.

Mme Helvétius' estate lay down the road a little way, in Auteuil, and Franklin would stroll across the fields to dine with her at least once a week. She was the widow of the farmer-general and skeptical philosopher whose works are still of sufficient importance to be read in our courses in eighteenth-century literature, if not in the sophomore survey course. She was immensely rich and patronized in her salon half the freethinking intellectuals of Paris. Once they celebrated her recovery from an illness by gathering four hundred strong at her house, with a troupe of Paris actors to perform a tragedy in her honor. She was a very grand lady indeed, with the kind of manners which transcend ordinary good manners to become the carefree bad manners of those who are above criticism. Franklin took Abigail Adams to call upon her, and the worthy Abigail was shocked—by her hearty kissing of the great doctor, by her locking her hands with his during dinner, by her sloppy and even dirty dress, and by her casual use of her petticoat to expunge the humectations of her lap dog, whose manners were as lordly as her own. "I own I was highly disgusted," said Mrs. Adams, "and never wish for an acquaintance with ladies of this cast." Indeed, Mme Helvétius' salon, with its eighteen cats, ten dogs, and many unwashed philosophers, must have had some gust of the stable.

But Franklin loved her, as a man in his seventies may, and proposed marriage to her. Some biographers treat the proposal as a mere pleasantry, one of Franklin's typical hoaxes. At any rate, Mme Helvétius took it seriously. She was so startled that she nearly knocked over the plaster reproduction of her husband's tomb. She went to her old friend and former suitor, Turgot, for advice. What advice can one expect from a rejected suitor? He counseled her sternly to commit no such folly when past sixty. Struck by this coarse reality, she informed Franklin that she would be faithful to the memory of her husband.

Franklin's response was the famous letter telling how, vexed by

her barbarous resolution, he dreamed he passed to the Elysian Fields. There he was received with great courtesy by Helvétius himself. Helvétius remarked that since it is necessary to forget in order to be happy, he had taken a new wife in Elysium. Thereupon his heavenly spouse appeared, returning from a housewifely expedition to hunt the best nectar and ambrosia. She was none other than Mrs. Franklin. "Let us revenge ourselves!" cried Franklin to Mme. Helvétius.

I do not want to belabor a bagatelle, but I think there was some under-meaning in Franklin's evocation of his wife at such a tender moment. Deborah Franklin had no doubt every virtue, but she was almost totally illiterate; her extant letters are so phonetic as to be nearly incomprehensible. She could bring Franklin no intellectual companionship; indeed, she was not intended to do so. Franklin, the rising young printer, had married her for advantage, to have a reliable person to tend the shop in his absence and to correct his too frequent errata under the head of venery. She refused to join him during his long residences in England, and Franklin was probably happy not to be embarrassed by her. Few expressions of affection occur in his letters to her, though he once bought a teapot whose conformation reminded him of her and on one occasion—he was with the troops at Easton, in 1756—having received no letter from his wife, he wrote to complain and added a postscript: "I have scratched out the loving words, being writ in haste by mistake, when I forgot I was angry."

The contrast between the two women was ready in Franklin's mind. He had long since outgrown Deborah's humble virtues. Mme Helvétius represented to him another order of existence: aristocratic assurance, great wealth, the patronage of free and radical thought. The *sans-gêne* of her speech and manners, which so offended Abigail Adams, delighted Franklin. Abigail Adams behaved like a lady; Mme Helvétius had no need to behave like anyone. Franklin's letter to her was indeed a jest; but, like most of his jests, it was intended to convey a truthful meaning.

The second of his great loves was his neighbor, Mme Brillon de Jouy. She was beautiful, "one of the handsomest women in France," says Abigail Adams, intelligent, *sensible* as the mode required, and unhappy, for her husband was unfaithful, even falling foul of his daughters' governess. Mme Brillon was in her mid-thirties and had two beautiful daughters, whom Franklin adored almost equally with the mother. In her turn she adored Franklin as the god of Wisdom and Goodness. She wrote him:

I began by worshiping you with the respect that everyone owes to a great man; then I was curious to see you, and to flatter my self-respect by receiving you into my home. After your visit I could remember only your sensitive friendliness, your simplicity and goodness. I said to myself, this man is so good he will love me, and I have since begun to love you deeply, hoping you would return my affection.

Franklin carefully preserved one hundred nineteen of her letters, which are now in the collections of the American Philosophical Society. These, with some rough drafts of his replies, tell the story of an old man's ardor and preserve the memory of many days of silvery happiness. Franklin composed most of his charming Bagatelles for her, and set them up with his own hands in his private print shop. He dined with her twice a week. She permitted him many little intimacies, but no great ones. She wrote: "Do you know, my dear Papa, that people have the audacity to criticize my pleasant habit of sitting upon your knees, and yours of always asking me for what I always refuse?" And he wrote her to apologize because he had begun a game of chess in her bathroom, and the chess game had prolonged itself in the manner of chess games, and she had been kept for hours in her bath tub. No doubt it was a covered tub. But even so, the friendly mood of the bathroom, with its steamy, erotic savors, was a delightful one for an old man. Abigail Adams would not have allowed him to play chess in her bathroom, nor would Mrs. Rittenhouse or Mrs. Shippen.

Mme Brillon stated that Franklin was always asking for what she always refused. She took no offense at his asking; he was simply following the code of eighteenth-century French gallantry. Was he serious in beseeching what he called Christian charity, or was it all mere comedy? He wrote her a little apologue about a beggar (himself) asking a niggardly bishop (Mme Brillon) for a louis in alms. The bishop refused; the beggar reduced his requests, and asked finally for a penny or the bishop's blessing. "I will give you my blessing," said the bishop. "I don't want your blessing," rejoined the beggar. "If it were worth a penny, you wouldn't give it." Mme Brillon replied to this moral tale:

You adopted me as your daughter, I chose you for my father: what do you expect from me? Friendship? Well, I love you as a daughter should love her father. The purest, the most tender and respectful affection for you fills my soul; you asked me for a louis, I gave it to you, and yet you murmur at not getting another one, which does not belong to me. It is a treasure which has been entrusted to me, my good Papa; I guard it and will always guard it carefully. Even if you were like Colin sick, in truth I could

not cure you; and nevertheless, whatever you may think or say, no one in this world loves you more than I.

This is not the tone of badinage. It is plain speaking to a too importunate lover. Franklin, even in his mid-seventies, had no taste for Platonic love.

I find the memorials of this ancient amour very touching. The old gallant was trying to warm himself with Mme Brillon's generous heart, but he craved at the same time the warmth of her fireside. He wanted a home; he wanted to be part of a family. He tried to arrange a marriage between his grandson and one of Mme Brillon's daughters. The Brillons refused, on the ground that they could not bear to see their daughter depart for America. Perhaps there were unspoken reasons. William Temple Franklin seems never to have inspired much confidence in anyone but his grandfather.

Time passed. Franklin's work was done; he had found no home; his gout and the stone in his bladder caused him increasing pain. He grew homesick; he longed to be again among his own people, to be loved and tended by his own flesh and blood. He wrote, in 1783: "The French are an amiable People to live with: They love me, & I love them. Yet I do not feel myself at home, & I wish to die in my own Country." He planned his return. The worst part of the journey would be the trip in a jolting carriage over the cobbled highway to Le Havre. He thought, only half whimsically, of obtaining a small balloon with a basket for his transport, the balloon to be anchored to a heavy cart. The Queen of France solved his problem by lending him a royal litter, a curtained bed suspended on shafts front and back, borne by two mules.

He left some sad hearts in France. Mme Helvétius, weeping, said to Mme Brillon: "Ah, that great man, that dear man, we shall see him no more." And Mme Brillon replied: "It is entirely your fault, Madame."

In Philadelphia, the memory of enchanted days comforted the old man's heart. He wrote to the Duc de La Rochefoucauld in 1788: "I love France, I have a thousand reasons for doing so; and whatever promotes or impedes her happiness affects me as if she were my mother." And to Mme Lavoisier, the wife of the great chemist: "Now, even in my sleep, I find that the scenes of all my pleasant dreams are laid in that city, or in its neighborhood."

But in his sober waking hours he knew that he had chosen well in returning to America to die. He was too old, too tired, for the diver-

sions of the intellect or the games of gallantry. He wrote to the Abbé Morellet:

> Though I could not leave that dear nation without regret, I certainly did right in coming home. I am here in my *niche* in my own house, in the bosom of my family, my daughter and grandchildren all about me, among my old friends, or the sons of my friends, who equally respect me, and who all speak and understand the same language with me; and you know that, if a man desires to be useful by the exercise of his mental faculties, he loses half their force when in a foreign country, where he can only express himself in a language with which he is not well acquainted.

At this point a subsidiary question, but one of singular interest to me as a professor of foreign language, obtrudes itself. In those days very few Parisians, and only two or three of Franklin's close friends in France, spoke English. What was Franklin's competence in French?

He had had no instruction in any language, ancient or modern. But as early as 1733, when he was 27, a serious-minded printer handicapped by his lack of education, he began to teach himself languages. He obtained a reading knowledge of French, Italian, Spanish, German, and Latin. Throughout his life he read French, and he had a sharp eye for a mistranslation. It would be interesting to know his method of study, which was undoubtedly original, practical, and economical of effort. Since his aim was a reading ability alone, he wasted no time on the finesses of grammar, on, for instance, the genders of nouns. He told Mme Brillon that the question of genders had bothered him for sixty years, and that at 76 he still found French feminines a plague. He looked forward to paradise, where, we are assured, these distinctions will be abolished.

When he came to Paris at the age of 70, he found himself under the necessity – which may evoke some sympathy among you – of converting his reading knowledge into a speaking, comprehending, writing knowledge.

In comprehension of the spoken language, I should give him a B-plus. His friend the Abbé de La Roche tells us that in direct colloquy Franklin understood everything, but that when four or five were speaking together, he would become lost and bewildered. Surely most of us have had this experience. Just as we are congratulating ourselves on our mastery, we join a group exchanging witticisms or mockeries, with the aid of ellipses, slurring phrases, secret references, catchwords and bywords and even grunts and sniffs. We nod and smile with the others; we try to understand; we think about

trying to understand; we watch ourselves trying to seize the sense without awareness of the words. But we are not inside the talk; we cannot pass the sound barrier. On reflection, I shall raise Franklin to an A-minus.

His spoken French was adequate to his purposes. His pronunciation was good enough to be comprehensible, bad enough to fit with his character as the Danubian peasant. His lucid mind found lucid words to express his thoughts, even though the terminations might be capricious and though the past participles might wantonly defy their antecedents. His friend Cabanis said that the irregularity of his language added to it strength and grace. He said the right thing at the right time. Mme Brillon assured him: "It is always good French to say: *Je vous aime*." I set down a B on oral French. Well, perhaps B-plus.

His written French was dreadful. Let me take an example: a letter to Mme Helvétius, written in Philadelphia in October, 1788: "Je pense continuellement des plaisirs que j'ai joui dans la douce Société d'Auteuil. Et souvent dans mes Songes, je déjeune avec vous, je me place au coté de vous sur une de votre mille Sofas, ou je proméne avec vous dans votre belle jardin." I take my red pencil. *Penser à*, not *penser de*. *Dont j'ai joui*, not *que j'ai joui*. *A côté de*, not *au coté de*. *Vos mille sofas*, not *votre*. *Je me promène*, not *je proméne*. *Beau jardin*, God help us, not *belle jardin*. An F, Ben Franklin, an F! Nevertheless, the passage is absolutely clear, it conveys the meaning entire, and it conveys the emotional message. I am suddenly disconcerted by the remembrance of a troubling text. Mme Brillon once wrote him: "Your dialogue amused me very much, but the corrector of your French spoiled your work. Believe me, leave your works as they are, use words that say things, and laugh at grammarians, who, by their purity, weaken all your sentences."

Mme Brillon, please take my red pencil and keep it.

My Introduction, I observe, has occupied half my time. On the presumption that this august body expects a communication of some weight and substance, I had proposed, and I still propose, to treat two major themes: the influence of your great fellow member on France, and the influence of France on Franklin.

France was well aware of Franklin the scientist and of Franklin the defender of American liberties long before his arrival in Paris in December, 1776. I need do no more than recall the story of his dramatic appearance. He wore a serviceable brown suit, a fur cap to

supplement his thinning hair, and spectacles – not his famous bifocals, which he did not invent until 1784. He carried a bamboo cane, not a sword. He expected to buy in Paris a costume in the mode and a proper wig. But immediately his startling exterior was taken by all France as the representation of philosophy in a state of nature, and Franklin was Poor Richard, *le bonhomme Richard*, in person. The alert hairdressers of Paris imposed on the ladies a *coiffure à la Franklin*, in imitation of his marten cap. Soon the hairdressers, attentive to the news, invented hair-do's *à l'insurgente*, *à la Boston*, *à la Philadelphie* and even *à la Belle-Poule*, to celebrate the victory of that vessel in a naval battle. This mighty structure included a three-masted frigate in full sail, with its batteries and flying banners.

Nor need I celebrate again Franklin's presentation at court, wigless, swordless, in his brown suit, white stockings, and plain buckled shoes. This is surely one of the best-remembered pictorial effects of history. It was apparently a brilliant improvisation on Franklin's part. The story seems authentic that the wig he had ordered proved to be too small, and that Franklin decided at the last moment to defy court etiquette and risk royal displeasure and a setback to his political purposes. He had confidence in his own success as a symbol.

The extent of that success needs to be constantly reiterated. John Adams said his reputation was more universal than that of Leibnitz, Newton, Frederick the Great, Voltaire; and Jefferson said he found "more respect and veneration attached to the character of Dr. Franklin in France than to that of any other person, foreign or native." He was elected to everything, including many European academies, including the inner group of the Physiocrats. He was one of the four commissioners of the Académie des Sciences. He and Voltaire were members of the powerful Masonic Lodge of the Nine Sisters.

One reason for his enormous success was that he was a double symbol. He made visible and concrete the effective blending of two philosophies: Rousseau's return to Nature and Voltaire's skeptical, anticlerical rationalism.

For the Rousseauists, he was the vindication of the Natural Man. It was presumed that he had grown up in primitive savagery, far from the corrupt, evil civilizations of Europe. He could make his great discoveries with ease, for his mind had not been warped by formal education. He was Émile in the flesh. His judgments must be true and honest, for they were based on Nature's dictates, on none of the expedient compromises and consecrated injustices of society.

Poor Rousseau, copying music for a living in his dismal fifth-floor room in the rue Plâtrière, must have felt very proud of his American avatar.

At the same time Franklin was a symbol of the philosophic faith in reason represented by Voltaire. I shall not relate again the story of their encounters and of the hysterical joy of the Parisians to see the great men embrace. Franklin and Voltaire were immediately congenial. They were of the same generation; both had been formed intellectually by the English radicalism and empiricism of Locke, Shaftesbury, and others; both held the devout faith that reason, unaided by revelation, can find its way to essential truth. Both were scientists, deists, instinctive skeptics, and libertines in speech and thought, if not in behavior. To Voltaire and the Voltairians, Franklin was the happy outcome of true liberty, now trammeled in France and England but existing in its purest form in America. He was a living proof that deism leads to virtue, that the church's system of promises, rewards, and penalties is unnecessary to the good life.

We are all, I suppose, either Rousseauists or Voltairians. We are either tender-minded or tough-minded; we are idealistic or practical; we look nostalgically backward or eagerly forward. The extraordinary thing about Franklin is that he could appear to unite in his person these warring qualities, to be a symbol for all, but a symbol of different things. All the French intellectuals, of whatever faith, agreed that Franklin was a messenger from a better world, bringing a gospel of liberty. "A new Prometheus," Condorcet called him. Bernard Faÿ insists that he was regarded as the saint of a new religion, for he displayed the mystic attributes of saintliness: humility, the power to work miracles, virtue, simple piety, and suffering.

The news of his death, which arrived in June, 1790, shook all of France. By that date the Bastille had fallen and the Revolution was gathering speed but had not yet reached the cataract of terror. The Constituent Assembly had nearly finished its constitution; the King was still King, though his throne stood unsteady in the flood. The Assembly, on receiving word of Franklin's passing, imposed three months of mourning on the country and itself wore black for three days. Such official grief had never anywhere, I think, been accorded a private citizen. The orators, mostly personal friends of Franklin, paid their tributes in sonorous words. Vicq d'Azyr made the Royal Society of Medicine vibrate with his cry: "A man is dead, and nations are in mourning!" At the Académie des Sciences, Condorcet compared

Franklin to Pythagoras and Socrates. Mirabeau told the Assembly: "The sciences owe their tears to Franklin, but chiefly Liberty and the French must weep. He has contributed toward the liberty which we enjoy; the sparks of his genius gleam in the Constitution of which we are so proud." The Duc de La Rochefoucauld d'Enville told of Franklin's efforts to promote deism and free thought in Philadelphia and attributed to Franklin's wisdom the adoption of the single legislative chamber by the French. At a celebration by the commune of Paris, the orator Abbé Fauchet concluded with moving magniloquence: "Thy memory belongs to all times and all peoples, thy glory belongs to eternity."

A remarkable tribute was offered Franklin by the Printers' Union. In their convention hall the most eloquent of their members pronounced a eulogy, standing beside the quizzically smiling bust of Franklin. Below the speaker stood a rank of printers' cases and presses. As the eulogy proceeded, a corps of printers set it up, and before the meeting dissolved, printed copies of the speech were distributed to all the delegates. As they emerged from the hall, they found hawkers selling small busts of Franklin, sculptured in stone guaranteed to be remnants of the Bastille.

In 1791 the cult of Franklin received a new impulse from the publication of his *Autobiography*, in truncated form, to be sure. The book was then, as it still is, a revelation to poor, ambitious young men of the heights to which one may rise by the judicious practice of industry, frugality, and calculated virtue, with no aid from priest or presbyter and little from Christian doctrine. Franklin revealed himself as the apotheosis of the Natural Man, and he showed, in one of the first "how to" books, how to achieve success in ten easy lessons.

The name of Franklin was invoked by the Revolutionists to stay every cause and opinion. The Girondins demanded a republic on the American model, with the spirit of Franklin to be its guide. In July or August, 1792, Roland, the Girondin, appeared at the King's Council in a Franklin costume, with a round hat, brown coat, and laces instead of buckles in his shoes. King Louis was deeply offended. At this time there were even some converts to Quakerism in France, and a proposal was made to establish a Quaker college in the château of Chambord, under the aegis of Franklin. Nothing could persuade the French that Franklin was hostile to the Philadelphia Quakers, as they were to him.

The Revolution continued on its way toward a welter of terror, tears, and blood. The extremists, the Jacobins, took as one of their watchwords Franklin's favorite phrase during the darkest days of our own Revolution: *ça ira*, "it will be all right." The song of *ça ira* was sung at a consecration of a bust of Franklin at Auteuil in 1792, and soon, with the refrain: *Ah! ça ira, ça ira, ça ira, Les aristocrates à la lanterne*, it became the triumphant knell of the dancers about the guillotine.

Through all the revolutionary years Franklin remained in honor. As late as the year VIII, or 1800, a festival in his memory was celebrated in the Temple of Victory, which we know as Saint-Sulpice, and a magician evoked his shade, together with that of Mahomet.

Professor Kenneth McKee, of New York University, has made a study of the type of American on the French stage during the Revolution.[1] Franklin, Voltaire, and Rousseau constantly appear as the holy prophets of proletarian revolt. Professor McKee, making no claim to literary merit for the melodramas and vaudevilles he has examined, notes that the maxims of Poor Richard and his precepts on good citizenship and integrity of character are constantly echoed. He describes, among many others, a Jacobin play, *l'époux républicain*, in which the hero discards the aristocratic-sounding name of Leroi and adopts the republican name of Franklin, which announces, he says, the frankness of his character and the liberty of his country. This newfledged Franklin carries his patriotism to the point of denouncing his wife for plotting to escape from France. The wife is guillotined, to the satisfaction of all true patriots.

Napoleon, naturally, disliked Franklin and suppressed public commemoration of his cult. Naturally, also, Franklin was anathema to the Restoration. But Louis-Philippe, the bourgeois king, would have found Franklin congenial; perhaps even he learned in Philadelphia to admire our hero. In 1832, early in his reign, a play was produced, *Franklin à Passy, ou le Bonhomme Richard*.

This is a pitiable vaudeville, or drama in which the characters constantly break into song. It assumes considerable knowledge of the Franklin story on the part of the spectator. There are many quotations from Poor Richard. Clearly Franklin and his achievements were planted in every mind. The final chorus goes:

[1] Proceedings of the American Philosophical Society, 83:479 (1940).

Eh! vite, aux États-Unis,
C'est là qu'on fonde
Un nouveau monde;
Eh! vite, aux États-Unis,
Ce pays
Est un paradis.

Tous: Eh! vite, aux États-Unis . . .

Jeannette: Cherchez-vous des demoiselles,
Plus sag's que dans nos couvents?
Voulez-vous des femm's fidèles?
Des homm's constans?

Tous: Eh! vite, aux États-Unis . . .

Since then, and to our own times, Franklin has been well fixed in the French consciousness. The Bibliothèque Nationale catalogue lists a long series of republications of his *Autobiography* and of *le Bonhomme Richard*. The *Autobiography* especially has become the dear companion of the poor, idealistic, ambitious youth who finds society walled against him but who sees his own character, and his own possible future, exemplified in the industrious apprentice with the seal of greatness on his brow. Ask any Frenchman, and he will tell you that the name of Franklin is one of those that he has never consciously learned; it is a name that he has known forever.

But the tracing of Franklin's vogue in France, the recording of his influence on innumerable lives, humble and high, is a task beyond my scope. I recommend it heartily to some candidate for the degree of doctor of philosophy.

The influence of France upon Franklin is easier to define. It is my conviction, and my thesis, that Franklin found in France his spiritual home. He found intellectual companionship and social satisfactions more appropriate and welcome to his character than anything he had known in America.

America in the eighteenth century was inevitably class conscious, and the Philadelphia of Franklin's young manhood was dominated by an aristocracy of gentlemen, all the more sensitive and jealous of their gentility as it was recent and insecure. This aristocracy was Anglican and Presbyterian; by 1750 the Quakers had dwindled to number only a fourth of the city's population. The Penns, the Proprietors, had rejoined the Anglican church, and their friends were bound to the proprietary interest, which Franklin always opposed. The aristocracy busily fenced itself against what it called "the mid-

dling sort," the rising tradesman class to which Franklin belonged. The middling sort infuriated the gentlemen by their leadership of the lower sort, the mass of the population, in political hurly-burlies. The middling sort resented the assumed superiority of the gentlemen. "Be freemen," said one of the middling sort to his fellows, "and you will be companions for gentlemen annually."

The gentlemen aped the English aristocracy, with their fine suburban houses, their fashionable clothes, their routs and balls. Typical of the class was Chief Justice William Allen, the Tory leader, who was educated at Cambridge, who had made the grand tour of Europe with his manservant. He was bitterly hostile to Franklin, whom he regarded as an upstart rebel. There were other great Philadelphia names, little remembered, even in Philadelphia, today, for many of them chose the wrong side in the Revolution, and their descendants, I suppose, are poor farmers and fishermen in Nova Scotia. But they were famous in their time. Your own John Adams, who willed his way into the aristocracy, praised almost enviously the "freedom and ease of behaviour" of "the nobles of Pennsylvania."

Franklin was most clearly not one of the nobles of Pennsylvania; he was in fact constantly in revolt against them. He was ostentatiously of the middling sort, as he made clear by pushing his own wheelbarrow loads of paper through the Philadelphia streets, not from niggardliness but out of calculated policy. He was proud of his class and proud of his intellectual superiority to the gentlemen. He was angered, and no doubt a little hurt, by their patronizing airs, as when he received a letter from an Episcopal minister commending his proposed curriculum for his college: "Nobody would imagine that the draft you have made for an English education was done by a Tradesman."

Faith in the merits and rights of birth was strong in eighteenth-century America. John Adams, in his *Defence of the Constitution of the United States,* proposed that "the rich, the well-born, and the able" should be set apart from the common lot in a Senate. Franklin, though rich and able, was far from wellborn. Adams' dislike of him was surely inspired in part by his aversion to dealing with a Boston tallow chandler's son as an equal.

Franklin's eminence in Philadelphia brought about eventually a reluctant opening of the closed ranks of society. His wife was accepted as a patroness of the fashionable Assemblies, and his illegitimate son was one of the dancers. Poor fat Deborah, whose grammar was incoherent, whose accent surely was vulgar, who used in contro-

versy, says an acquaintance, "the foulest terms I ever heard from a Gentlewoman," whose mother had peddled a cure for lice and the itch, poor fat Deborah, I say, what were her thoughts as she sat among the nobles of Pennsylvania? At this distance, perhaps, we are not authorized to read them.

It is clear, at any rate, that Franklin was never fully accepted by the gentry of his city. Even in 1906, his editor, the Philadelphian Albert Henry Smyth, could write: "In Philadelphia, the city of his second birth, an hereditary hostility, derived unconsciously from the ancient proprietary feud, still exists, and opposes to the fame of Franklin an attitude of serious censure or contemptuous indifference."

Compare Franklin's confinement within the rigid frame of Philadelphia society with his experience abroad. In general, the man out of his setting gains freedom of movement, up or down in the social scale. Society does not obligate itself by receiving the interesting foreign visitor who claims no permanent standing, especially if he is not encumbered with a wife.

Franklin first arrived in London when he was nearly 19. Though a mere journeyman printer, he wrote and published a philosophical pamphlet, joined a club of minor wits captained by Bernard de Mandeville, whose *Fable of the Bees* is by no means forgotten, exchanged calls with Sir Hans Sloane, then secretary of the Royal Society, and was promised, though vainly, an introduction to Sir Isaac Newton. His evident intellectual superiority enabled him to leap the usual barriers of caste.

His second visit to England began in July, 1757. The next twenty-eight years, except for two brief stays in America, were spent in Europe. (Deborah constantly refused to join him abroad.) As agent for the Colony of Pennsylvania, and later as commissioner for all the Colonies, he dealt with the makers of destiny, from the King down. As Fellow of the Royal Society, as honorary Doctor of Oxford and St. Andrews, and as a world-renowned scientist, he had access to the scientific and cultural world of Europe. He found at last a really stimulating intellectual companionship. In America he had been almost alone, acting always as the originator, the organizer, the inspirer of others. In the world of science, for instance, I find among his American friends only three who seem to be nearly his peers: John Bartram and Benjamin Rush, of Philadelphia, and Cadwallader Colden, of New York.

He was at home in England, for after all he thought of himself as

an Englishman almost up to the outbreak of the Revolution. He was an Englishman, as, for instance, a third-generation Briton in Hong Kong is English and not Chinese. He was happy in the homeland, at least until the approach of war roused ugly passions in erstwhile friendly breasts. Returning to America in 1763, he wrote to William Strahan: "No friend can wish me more in England than I do myself." And to Mary Stevenson: "Why should that little island enjoy in almost every neighborhood more sensible, virtuous, and elegant minds than we can collect in ranging a hundred leagues of our vast forests?" And to Lord Kames in 1767: "I have lived so great a part of my life in Britain, and have formed so many friendships in it, that I love it, and sincerely wish it prosperity." And finally to his son William in 1773: "I have lost so many friends since I left America that I begin to fear that I shall find myself a stranger among strangers when I return. If so, I must come again to my friends in England."

He found, then, in England a spiritual home more congenial in many ways than was America. When war made England unlivable, he found another spiritual home, even more congenial, in France. For I dare to think that his mind was more harmonious to that of eighteenth-century France than it was to that of England or that of America.

He was a *philosophe* in the French sense. The *philosophes* were men who combined the principles of rationalism with the experimental method. They were mostly deists, though some were outright atheists. They were freethinkers, regarding sin as merely a social sanction, not as the divine punishment of man's disobedience. They were devout believers in science and practiced it to the utmost of their ability. They discovered and honored the practical achievements of the artisan. They had a holy faith in progress, and they were convinced that reason and enlightenment (*les lumières*) were competent to lead man to truth and would surely do so. They were rebels against all dogmas of church and state, for dogma, by definition, puts an end to discussion, arrests progress, freezes the mind. They had little taste for poetry, or their poetic impulses were diffused in dreams of science and sociology. Their emotional lives were likely to be stirring, for they sought fullness of experience, free from rule and repression. The results in practice were often reprehensible by Philadelphian or Bostonian standards. When they spoke of *vertu*, they did not mean abstinence from extramarital relationships, they meant a thrilling quality of soul, impossible to measure.

This list of characteristics is almost a description of Franklin; it is by no means a description of the American eighteenth-century mind. Franklin was a *philosophe*. He recognized the *philosophes* immediately as his own people, and he was hailed by them as a fellow. Franklin's experience in France was the home coming of his mind, as it was the bright Indian summer of his heart.

People have talked enough about Franklin as a typical American. He was not typical; he was most exceptional. Colonial America never produced another Franklin. His spirit is, I think, more European than American and more eighteenth-century French than European. He was a *philosophe* who lived by chance in America and found only in his late years, in France, the true setting for his spirit. Therefore, somewhat on behalf of the French, I celebrate to you this evening the merits of *le grand Franklin.*

Benjamin Franklin and the Armonica

E. Power Biggs

In the early 1760's, while in London as agent for Pennsylvania, Benjamin Franklin became interested in the musical glasses. The result was perhaps the first musical instrument to be invented by an American.

In a definitive essay on the musical glasses, published in the *Proceedings of the Royal Musical Association* for 2 April 1946, Mr. Hyatt King remarks that the drawing of sounds from drinking cups is centuries old. The earliest musical use of "wine cups struck with a stick" is noted among the Chinese in an encyclopedia of 1300 A.D. A publication of 1677 in Nürnberg describes how to produce "a merry music" by filling

> eight glasses of equal form, putting in the first one spoonful of wine, in the second two, in the third three, and so on. Then let eight persons, with fingers dipped in wine, at the same moment pass them over the rim of the glasses, and there will be heard a very merry wine music . . . .

Progress of the glasses from providing after-dinner fun to a more musical use is recorded in Walther's *Musicalisches Lexicon* of 1732, which notes that concertos were played on the glasses, with support of violin and bass, by Christian Gottfried Helmond, of Silesia. Eisel's *Musicus* Αὐτοδιδακτός of 1738 has an illustration showing such an instrument being played (fig. 1).

But it is the personality of Richard Pockrich, an Irishman, that really starts the glasses tinkling. At about the time that Handel was first giving the *Messiah* in Dublin, Pockrich was offering concerts on the musical glasses in the same city. This picturesque gentleman appears to have been a rather enterprising scoundrel. The glasses caught his attention at a fairly late age, after he had run through a fortune of four thousand pounds in the promotion of fanciful and unsuccessful schemes.

Reprinted from the program of a concert of chamber music by Benjamin Franklin and Wolfgang Amadeus Mozart presented 11 April 1956 at Kresge Auditorium, Massachusetts Institute of Technology, Boston.

An associate tells the tale in *The Real Story of John Carteret Pilkington* (London, 1760). A singer himself, Pilkington describes his first meeting with Pockrich, "a tall middle-aged gentleman, with a bag-wig and a sword on," who declared that together they would make a fortune, with the glasses and Pilkington's voice. Pockrich modestly announces himself as " perhaps the best master of harmony in the known world " and adds that he will give an immediate demonstration.

> Saying so he pulled from his sleeve sixteen large pins, and from his pocket a small hammer; with which he drove the pins into a deal table, all ranged one above the other, and some almost in as far as the heads: then he took from his side pocket two pieces of brass wire, and demanded what tune I would have: I told him the Black Joke: then lay your ear to the table, says he, hear and admire: I did so, and to my infinite amazement, he played it with all its variations, so as to sound somewhat like a dulcimer.
>
> Encouraged by the applause I gave to this uncommon instrument, he took a parcel of drinking glasses, and tuned them by putting different quantities of water in each: upon these he played a number of the newest tunes in the most elegant taste, giving me delight and satisfaction. He then proceeded to inform me that these were but sketches and outlines of his grand art and discovery; for, said he, I have at home glasses as large as bells, of my own invention that give a sound as loud as an organ, but more delicate and pleasing to the ear . . . .

Together they called at Pockrich's lodgings, which Pockrich remarked that he " never suffers servants to clean, lest their damned mops and brushes would break his glasses." Pockrich proceeded to play Handel's Water Music and several other pieces.

A gala concert was set for Dublin, but, besides the noble strain of Handelian airs, a crash is heard, a shattering sound that unfortunately is to recur all too often in the narrative of the glasses.

> The songs I was to sing at my first appearance were fixed upon, and everything got in readiness for the important event . . . at length the hour arrived. The Taylors' hall was finely illuminated, the news papers filled with encomiums on the angelick organ, every publick corner was covered with large bills, and tickets dispersed among the nobility. About three hours before the concert was to begin, the Captain went to range and tune his glasses, when unfortunately stepping out for some water, a large unmannerly sow entered, and oh! guess the rest! – threw down the whole machine, and covered the ground with glittering fragments: destroying not only the hopes of the publick, but ours of a present and future subsistence. When the Captain returned, and found his lofty castles in the air reduced to an heap of rubbish, he looked just like Mark Anthony, when he beholds the body of Julius Caesar on the earth, and says:
>
> Oh! Mighty Caesar, dost thou lie so low?

Such misfortune did not daunt "Captain" Pockrich. He had lived several lives already. He was an adventurer and a man of resource who had ranged widely in his imaginative schemes. He had owned a brewery, he had schemes to plant vineyards on reclaimed bog land, he drew up plans for iron ships guaranteed to be unsinkable, he regarded human flight as possible and devised a set of wings for it. Besides such a minor enterprise as large scale goose grazing, Pockrich advocated "no less than a scheme for immortality upon earth," proposing that direct blood transfusions from a "strong healthy cook-maid, or kitchen wench" to any gentleman or lady of more than three score years "must totally abolish the effects of age." Pockrich even stood twice for Parliament, but without success.

Not the least of his triumphs concerned the truly magical effect of the glasses upon officers of the law, as related by Brockill Newburgh in his *Essays Poetical, Moral and Critical,* published in 1759.

> Mr. Pockrich, in his brewery near Island-bridge, happening one day to be seized by bailiffs, thus addressed them: "Gentlemen, I am your prisoner but before I do myself the honour to attend you, give me leave as an humble performer of musick, to entertain you with a tune." "Sir," replies one of the bailiffs, "we come here to execute our warrant, not to hear tunes." "Gentlemen," says the Captain, "I submit to your authority, but in the interim, while you are only taking a dram, . . . Here Jack" calling to his servant, "bring a bottle of the Ros Solis I lately distilled: I say Gentlemen, before you take a dram I shall dispatch my tune." In the meantime he flourishes a prelude on the glasses, and afterwards displays his skill through all the pleasing turns and variations of the Black Joke. The monsters, charmed with the magick of his sounds, for some time stand at gaze. At length, recovering [*sic*] their trance, thus accost the Captain: "Sir, upon your parole of honour to keep the secret, we give you your liberty." "Tis well, playing upon the glasses is not more common: if it were, I believe our trade would find little employment."

Curtains for such genius could only be dramatic. Pockrich and his "Angelick Organ" both perished in the fire that consumed the Royal Exchange, Cornhill, in November, 1759.

A discordant note sounds in a remark of one of his detractors, — that the victim of the fire dissipated his fortune without "ever even giving a good dinner." But Mr. Pockrich is hymned in the following verse, also from Newburgh's *Essays,*

> Old Pock, no more, still lives in deathless fame,
> He blazed when young, when old expired in flame,
> Mourn him, ye bogs, in tears discharge your tides:

No more old Pock shall tap your spongy hides
Ye geese, ye ganders, cackle doleful lays,
No more his mountain tops your flocks shall graze.
Be silent, dumb, ye late harmonious glasses:
Free from surprise securely sleep ye lasses.

From such colorful days, one enters the post-Pockrich period with a certain regret!

A number of characters now crowd the stage with variants of the musical glasses. The composer Gluck had used the glasses in a concert in 1746 at the Little Theatre in Haymarket. At Sadler's Wells, Miss Wilkinson, "a wire dancer and player of the Musical Glasses," flits briefly and provocatively across the scene. Concerts are announced by a Mr. Schumann, a Mr. L'Argeau, Miss Ford, and Miss Lloyd. Miss Ford published *Instructions for Playing on the Musical Glasses: so that Any Person, who has the least Knowledge of Music, or a Good Ear, may be able to perform in a few Days, if not in a few Hours.* A copy of this very rare book, the first "method" for the glasses, is in the Widener Library at Harvard.[1] The frontispiece, showing Miss Ford's version of the glasses, is reproduced in Figure 2.

Miss Ford was a quick worker. In her "method" she announces that she has only been playing the instrument for a fortnight, having first heard it a month before. Nonetheless, she gives detailed instruction on how to produce good tone. Rubbing the fingers with the "Pulp of an unripe Gripe [*sic*]," one pursues a circular motion around the rim of the glass. Miss Ford had ingenious ideas, too. She proposes tipping a glass, thereby altering the water level and changing the pitch of the tone. And further she relates:

> I have consulted an ingenious Organ Builder who is very confident he can give the same touch to these Glasses, and cause it to be done by the Keys, as on an Harpsichord; and I have employed him to make me an Organ with Glass Notes, instead of Pipes, which I have some reason to believe I shall soon produce before the Public, and which . . . may be an Instrument that will astonish and delight more than any ever yet performed on. . . . .

No record survives of the "Organ with Glass Notes," but one wonders whether she or the ingenious organ builder had hit upon the idea of rotating the bowls.

The simple idea of rotating the glasses was, of course, Benjamin

[1] Cataloged under Mrs. Philip Thicknesse. Not dated, but probably published in 1761.

Franklin's invention and contribution. This radical improvement transformed the instrument. Franklin lined up the glasses on a horizontal spindle, each glass inside the one slightly larger, yet not touching, and rotated the spindle by means of a foot pedal, governing the motion by a heavy flywheel (figs. 3 and 4). The bowls were blown in different sizes, and each ground to produce the exact note. In a famous letter to Beccaria,[2] Franklin relates how he was charmed by the sweetness of the tones of the glasses. "One Mr. Puckridge, a gentleman from Ireland, was the first who thought of playing tunes, formed of these tones." Franklin continues that he wished to see the glasses disposed in a more convenient form. He then outlines his scheme and adds detailed instructions concerning the blowing of the glasses, the manner of their tuning, and the way in which they are to be fitted to the spindle by means of corks. He specifies a compass of three octaves from G below middle C.[3]

> This instrument is played upon by sitting before the middle of the set of glasses as before the keys of an harpsichord, turning them with the foot, and wetting them now and then with a spunge and clean water. The fingers should first be soaked in water and quite free from greasiness; a little fine chalk upon them is sometimes useful, to make them catch the glass and bring out the tone more readily. Both hands are used, by which means different parts are played together. The advantages of this instrument are, that its tones are incomparably sweet beyond those of any other; that they may be swelled and softened at pleasure by stronger or weaker pressure of the finger, and continued to any length; and that the instrument, being once well tuned, never again wants tuning.

In conclusion, Franklin christens the instrument: "In honour of your musical language, I have borrowed from it the name of this instrument, calling it the Armonica. With great esteem and respect, I am, &c."

Thus at the hands of Franklin the glasses acquired rotation and became far more useful musically. The *Bristol Journal* for 12 January 1762 carried this account:

[2] The engraving of Franklin's Armonica (fig. 3) is reproduced from the second Italian edition *L'Armonica: Lettera del Signor Beniamino Franklin al Padre Giambatista Beccaria Regio Professore di Fisica nell' Univ. di Torino* (Milano, 1776), owned by David P. Wheatland, Esq., which was lent for use in this article through the kindness of Mr. Wheatland and Professor William A. Jackson, of the Houghton Library, Harvard University.

[3] Mozart's Adagio and Rondo calls for three octaves and one note – from F below middle C to F three octaves above.

The celebrated Glassy-chord invented by Mr. Franklin of Philadelphia: who has greatly improved the musical glasses, and formed them into a compleat instrument to accompany the voice, capable of a thorough bass, and never out of tune. Miss Davies from London, was to perform in the month of January, several favourite airs, English, Scotch and Italian, on the Glassy-chord accompanied occasionally with the voice and the German Flute.

The maker appears to have been Charles James, of Purpool Lane, near Gray's Inn, London. Forty guineas is said to have been the price, and the date sometime before 1761. Goldsmith's *Vicar of Wakefield*, published in that year, affords a measure of their popularity: "The two ladies threw my girls quite into the shade; for they would talk of nothing but high life, and high lived company, with other fashionable topics, such as pictures, taste, Shakespeare and the musical glasses."

Marianne Davies was the first of several "virtuosi," and Sonneck thinks that Franklin presented her with her Armonica. "Cherokee Kings and two Chiefs" were among those who listened to this artist in London, and she visited Dublin and Europe – from Paris to Vienna – with great success.

Marie Antoinette was a pupil of Marianne Davies. Leopold Mozart writes in a letter of January, 1771, to his wife, "You will surely remember Miss Davies and her Armonica," and in a letter of 1773: "Do you know that Herr von Mesmer plays Miss Davies' Armonica unusually well? He is the only person in Vienna who has learnt it and he possesses a much finer instrument than Miss Davies does. Wolfgang too has played upon it. How I should like to have one!"

Meanwhile, this instrument, invented in its main feature by an American, had become known in America. The *Pennsylvania Gazette* notes a concert in Philadelphia by Mr. Forage on 27 December 1764, "in which will be introduced the famous Armonica or Musical Glasses so much admired for the great Sweetness and Delicacy of its tone. Tickets at 7s, 6d. each."

Shortly thereafter the glasses were played in Williamsburg, an occasion recorded by George Washington in a diary entry of April, 1765: "By my Exps. to hear the Armonica, 3, 9." Boston was the scene of concerts on the musical glasses by Monsieur Jacobus Pick in the year 1792, and at his "Musical Room" in Baltimore, George James L'Argeau played the glasses. P. A. Van Hagen and John Christopher Moller were active in concerts in New York, and one event

included a *duetto* on the Armonica by the well matched team of "Pick and Petit."

Further improvements were interestingly foreshadowed in a very early notice (17 October 1774) in the *Pennsylvania Packet*, which mentioned ". . . a new instrument, a cymbaline de amour which resembles the musical glasses played by harpsichord keys, never subject to come out of tune. . . ."

In Europe, the fascination that the instrument held for Anton Mesmer and for the Mozarts is particularly notable. Mesmer was an expert player and found the novel strains of the Armonica extraordinarily useful in his "cures." Mozart at age 16 heard Mesmer play the instrument, but it was not until about twenty years later that he was inspired to write for it.

During these years Franklin's invention had undergone further improvement. Franklin put the glasses on the spindle, and shortly thereafter several inventors tried to devise a keyboard. The idea was a natural one and occurred to many. A keyboard was planned by P. J. Frick as early as 1769. Other persons concerned were Hessel, of St. Petersburg, 1782; H. Klein, of Pressburg, 1784; D. T. Nicolai, of Gorlitz, 1784.

In America the idea occurred independently to Francis Hopkinson. Thomas Jefferson was so pleased with the scheme that he said its success would be "the greatest present which has been made to the musical world this century, not excepting the pianoforte." Franklin was interested in the idea of a keyboard, and in a letter of 1785, written at Passy to the Comte de Salmes, mentions the names of various people who – not too successfully, it seems – attempted to carry it out.

To leave the story of the musical glasses for a moment and give a brief summary of what is known about Benjamin Franklin's musical abilities may here be appropriate. Franklin had a keen interest in music and his knowledge was extensive. At an early age he could have heard good music and plenty of it in Boston. Of a visit to the Moravians in Bethlehem, in 1757, he notes in his *Autobiography* that he was at their church, "where I was entertained with good musik, the organ being accompanied with violins, hautboys, flutes, clarinets, etc."

His tastes in music were direct, and on the merits of certain music he was outspoken. He preferred melody unadorned by many embellishments and wrote of his particular fondness for Scotch airs, which "will probably live forever – if they escape being stifled in modern affected ornament." He appears to have played the violin,

harp, and guitar with fair proficiency, and perhaps the violoncello.

When abroad, Franklin attended concerts, and of his contact with George Frederick Handel, the following moving passage appears in James Parton's biography: "Franklin was just in time to see the sublime old man, one of the sturdiest characters of modern times, led to the organ for the last time, and conduct one of his own works. . . ." In France, too, Franklin must have heard a great deal of music, in concerts, at the opera, and at the home of Mme. Brillon.

Franklin's String Quartet, discovered only recently, displays an amusing combination of musical skill, practical sense, and humor. Tongue in cheek, he claims that stringed instruments are easy to play – provided the complication of fingering the notes is removed from the problem of bowing the strings. So three violins are tuned to different groups of notes, and off the Quarter sets on a composition played just on the open strings. Ingenuity was Franklin's middle name.

But the picture of Benjamin Franklin playing, no doubt a Scotch air, on his Armonica is one that sums up his musical life and chief affection. An early Irish musical dictionary prints a picturesque though perhaps imaginary story. It relates how, on his return to America, Franklin assembled his instrument in the attic of his Philadelphia home. Completing it late at night after the household had retired, he started to draw forth its "angelick strains." Floating down from above, these sounds were so heavenly that his wife awakened with the conviction that she had died and gone to Heaven and was listening to the music of the angels.

To return to the Armonica in Europe, it appears certain that in the 1780's someone had evolved a successful keyboard and playing mechanism. The blind girl Marianne Kirchgessner, the most famous of the Armonica virtuosi, inspired Mozart in the last year of his life to compose for her one of his most perfect and delightful works – the Quintet for Glass Harmonica, with Flute, Oboe, Viola, and Cello (K. 617). Mozart himself, probably playing the viola, performed this piece in Vienna with Miss Kirchgessner. The composer also wrote a solo Adagio (K. 356) and left incomplete sketches of another composition for the instrument. Playing Mozart's "heavenly" music (as Einstein has since called it), Marianne Kirchgessner barnstormed through Europe with a success outstripping that even of Marianne Davies.

With Miss Kirchgessner and Mozart's music the Armonica appeared to reach its peak of popularity. Beethoven was to write a

fragment for the instrument in the opera *Leonora Prohaska;* J. G. Naumann composed a set of sonatas, and works by Martini, Jommelli, Galuppi, and Röllig are listed, but the gathering thunder of nineteenth century romanticism gradually destroyed interest in the soft and subtle sounds of the glasses.

Instruments, nevertheless, were made, played, and shattered. One such is attributed to Ferdinand Pohl, working about 1803. In *Cursory Notices of the Origins and History of the Glass Harmonica,* written for the International Exhibition in London in 1863, Charles Ferdinand Pohl relates how his grandfather

> at length had the satisfaction to see the first instrument finished at his hands. With great joy he opened the door of the working room to call for his wife to be witness of his success, when a draft of air closing violently the door, the portrait of St. John, hanging over the instrument, fell and broke it in pieces.

Charles added that Ferdinand, having in his first excitement stamped violently on the poor saint, "soon resolved to construct a new instrument, the precursor of a very great number . . . which are now dispersed nearly throughout the world." A later Armonica was exhibited by Pohl at the International Exhibition.

Pohl's father, C. T. Pohl, was also a player of the instrument. Of him we are told the following harrowing incident.

> In Berlin . . . where he sojourned from 1810 until 1816, he once arranged a concert . . . with a trio for three Armonicas. Difficult as it is to find two Armonicas which accord well together, the difficulty is greatly augmented to find three instruments which agree well – in fact, such is very seldom to be found. The artist had borrowed the third Armonica of a private gentleman, who valued it so highly that he was only by urgent entreaty induced to part with it for one evening. The concert was attended by a crowded and delighted audience, and is thus mentioned (Berlin, 9 February 1812): "The perfectly assimilating execution, and the pure intonation throughout of all the three Armonicas, conveyed to the hearer the idea that but one instrument was played."
>
> The more it must have been terrible to the artist, when, at the end of the evening so successfully past, the very instrument which had been with such entreaty obtained, fell to the ground through the carelessness of the porters; all the glass bells were broken and thus the truly happy result of the evening was destroyed in the most painful manner.

Having graduated from the dinner table to the concert stage, having interested the inventive mind of Franklin and inspired the musical genius of Mozart, the glasses dropped out of fashion. But not before

they prompted this parting thought in Table Talk for 1834 (which incidentally makes one regret that Poor Richard did not comment on the subject): "Some men are like musical glasses, to produce their finest tones, you must keep them wet."

EPILOGUE

There is little record of actual performances on the Armonica since the London Exhibition of 1862, and instruments appear to have remained mostly in museums in solitary silence. But the coincidence in 1956 of the 250th anniversary of Benjamin Franklin (born in Boston on 17 January 1706) and the 200th of Wolfgang Amadeus Mozart (born in Salzburg, Austria, 27 January 1756) called for some renewing of the match between Franklin's instrument and Mozart's music. And more so, since the project would unite aspects of science and art and honor Benjamin Franklin, who was an early and honored Fellow of the American Academy of Arts and Sciences.

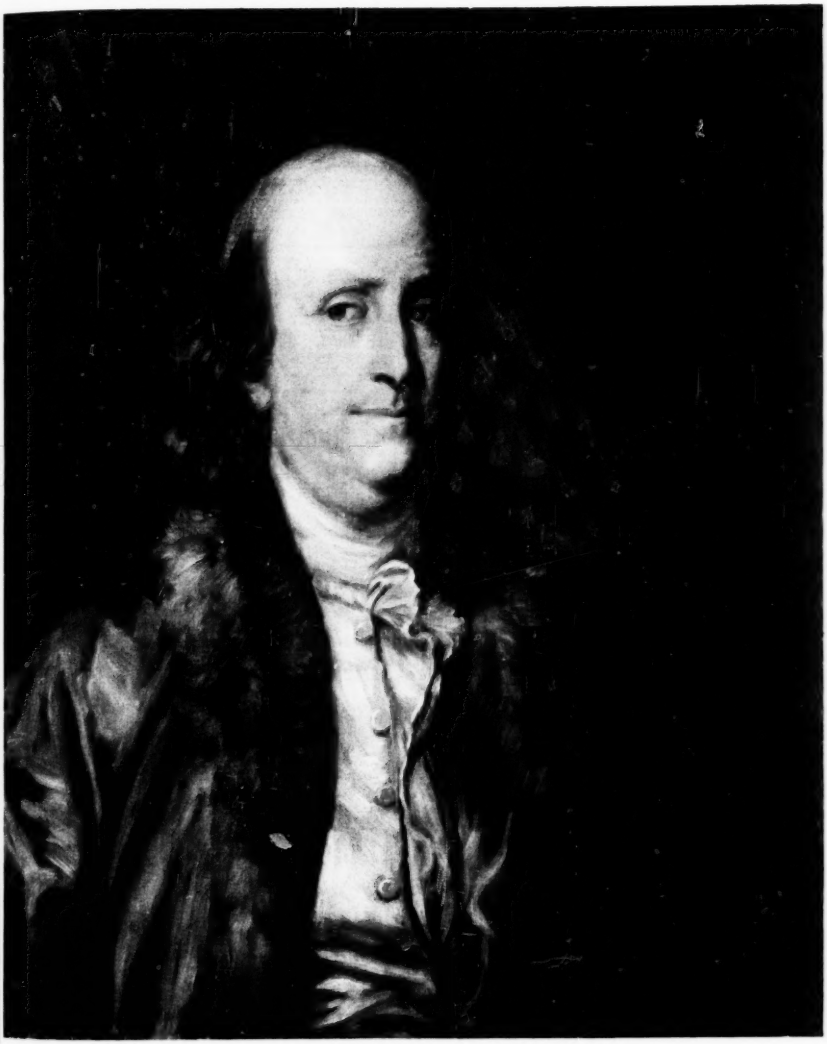
Thus, under the direction of Dean John E. Burchard, President of the Academy, and with the enthusiastic support of Dr. Harlow Shapley, Chairman of the Franklin Committee (whose professional interest in the music of the spheres holds a love of music and for the sounds of – let us say – half spheres), the project took shape. The glass blowing was carried out by the Corning Company, the Steuben Division artisans blowing each bowl in the manner centuries old. The cabinet and the invention and construction of the keyboard mechanism were the work of the eminent Buffalo organ builder, Herman Schlicker.

Generously, the Franklin Savings Bank of Boston stepped forward to assume the costs of construction, while presenting the instrument to the American Academy.

The pace of time and the deadline of a concert accord ill with the tempo of experiment. Our Glass Armonica is an instrument in transition.

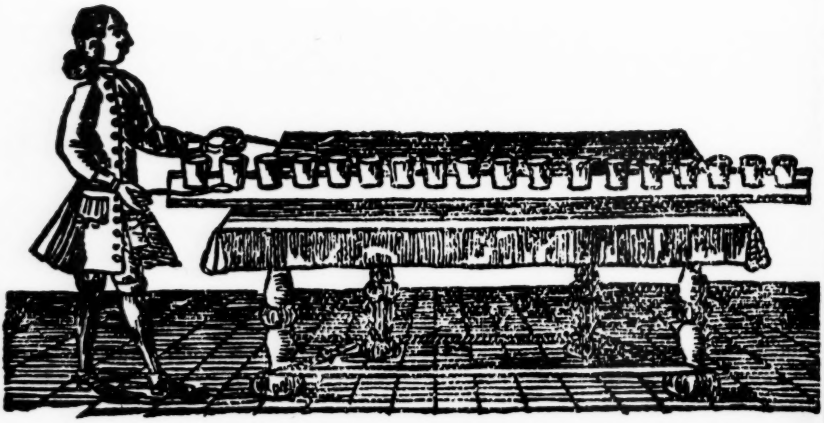
Franklin's letter to Beccaria is a carrot before the nose, whetting the appetite with visions of celestial harmonies. Yet it provides little except basic design and fails to bridge the gap between Franklin's favorite "Scotch Airs" and the art-music of Mozart.

How did Miss Kirchgessner play the rapidly moving passages of Mozart's Adagio and Rondo? History does not tell. Technical writers such as Mueller and Pohl might have left some clue to the precise

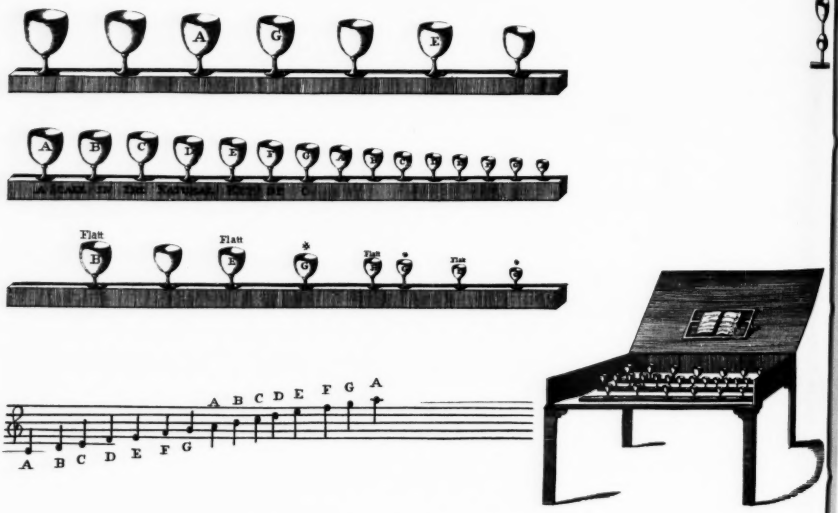


Benjamin Franklin

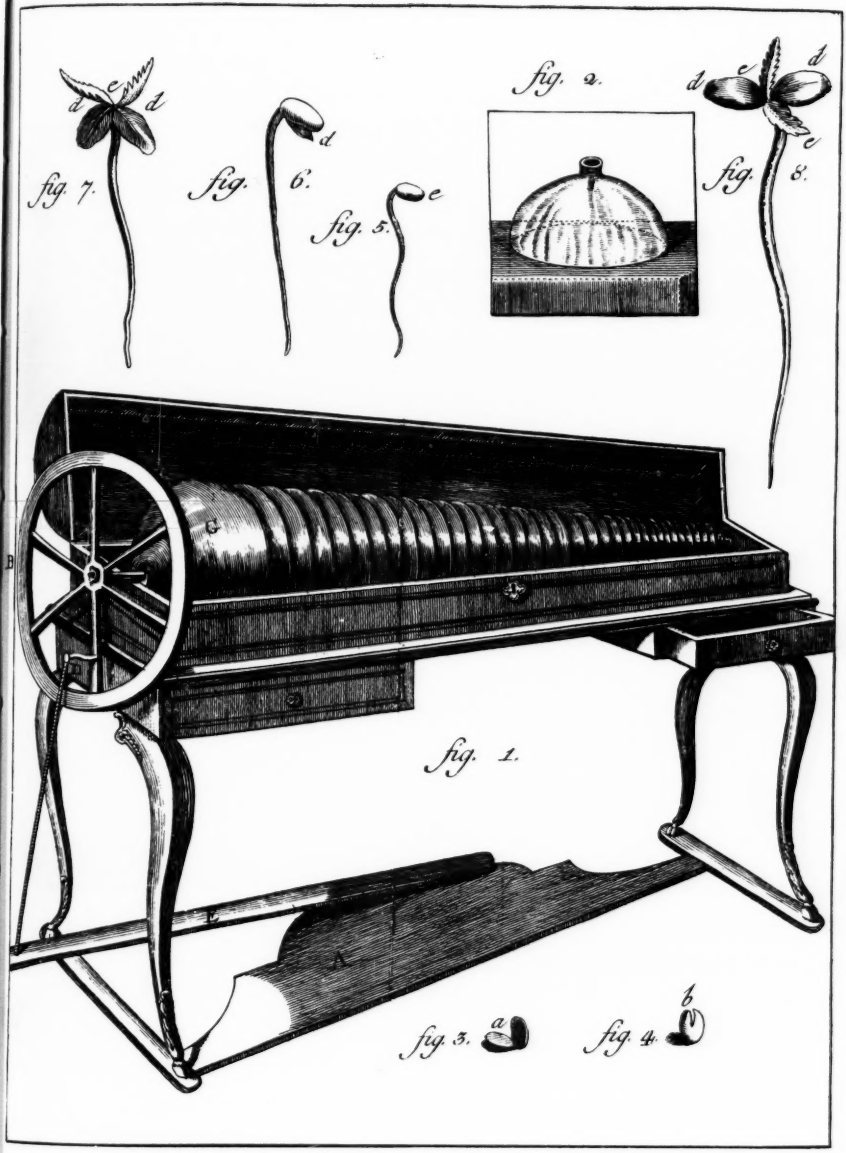
Copy by Alfred Ordway (1819-1897) of a painting by G. P. A. Healy, 1846, after a Greuze crayon, owned by the American Academy of Arts and Sciences.



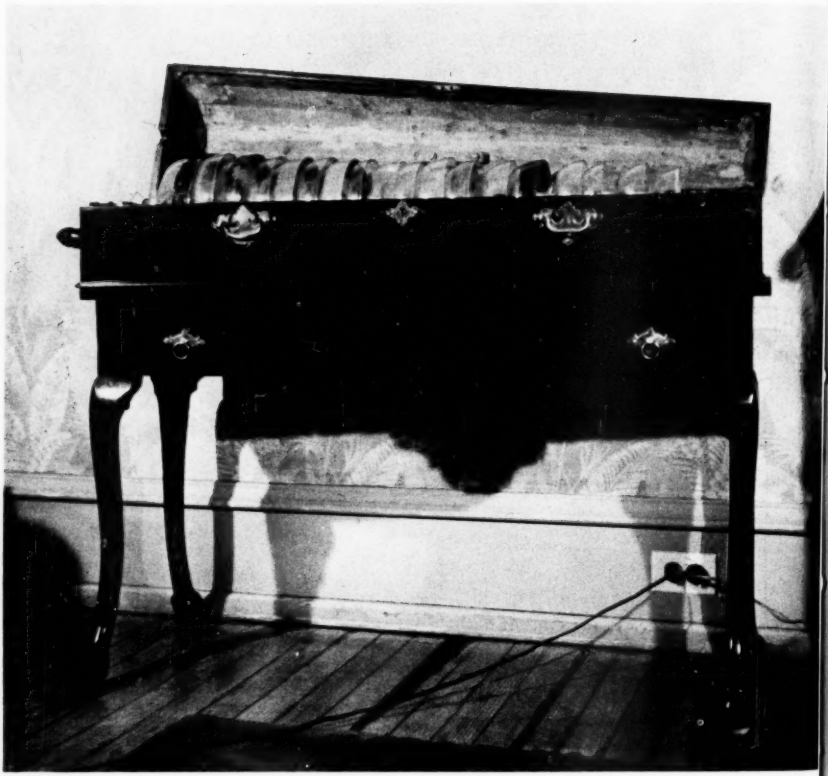
1. Musical glasses according to Eisel, *Musicus* Αὐτοδιδακτός of 1738.



2. Musical glasses according to Miss Ford's *Instructions* of 1761.



3. Armonica according to the second Italian edition (Milan, 1776) of Benjamin Franklin's *Letter to Beccaria.*



4. Benjamin Franklin's Armonica, owned by Mr. and Mrs. Wistar MacLaren, of Philadelphia.

mechanics of the keyboard Armonicas, yet they are notably reticent on the subject, and investigation in the museums of Europe and of the United States has so far failed to turn up any surviving instrument.

Experimental attempts at reconstruction have produced many problems. How were glasses once made, perfectly centered and responding quickly at the slightest touch? What is the magical substance that will overcome inertia instantly, persuading – yet not striking – a glass into musical speech? And in its enthusiasm of producing tone, how does a glass stop short of shattering itself?

Our varied and hectic empirical efforts over a period of months have duplicated all too literally the trials and tribulations that beset "Captain" Pockrich and his successors.

But, in the words of some old English poetry, "Everye sweete will have its sowre," and our experiment will be a continuing one!

The Chinese Painter

Phi Beta Kappa Oration delivered at Harvard University on 11 June 1956

CHIANG YEE

THE WORD "Chinese" in my title conveys a reference both to the birthplace of the painter and to the type of work to be expected from him; but while that is what I mean, I wish to point out that the word has not the same significance today as it would have had fifty to a hundred years ago. Then a "Chinese" painter was a painter absolutely and exclusively Chinese, differing fundamentally from the painters of all other nations and races. When I speak of a Chinese painter of today, I mean one who is basically Chinese but not exclusively so in his creation. He is not, and should not be, isolated from or independent of the rest of the world, for he has his part to play in the cultural evolution of the world.

Einstein's discovery of the time factor as the fourth dimension has altered every aspect of the universe and human affairs. Time has always been a factor in human life, but it was left to Einstein to bring this to our notice. Since his work, none of us can look at things without considering the time factor. My appearance before you is accounted for by the time factor. Had I been born a hundred years ago, it is in the highest degree impossible that I should have had the honor of being asked to give this oration; but even supposing this unlikely eventuality had somehow occurred, and even if you had been so gracious as to assume that I could manage to express myself to the extent that I now can, I am afraid the audience of a hundred years ago would quickly have had the doctors busy with complaints of headaches, for what I am about to say would have seemed wild nonsense. To this day, preconceptions and misconceptions between peoples remain, but now views can be exchanged freely and mutual understanding approached. Mutual understanding has long been a goal, and I should like my oration on "The Chinese Painter" to be regarded as an exposition of the interdependence of all cultures – a step towards entering the sphere of mutual understanding of all peoples.

My aim would thus appear superficially to be the opposite of

Emerson's in his famous oration on "The American Scholar." Emerson wished the intellectuals of his country to be American "body and soul"; and his oration has since been called the American "intellectual Declaration of Independence." It claimed for American scholars the same recognition that European scholars had long enjoyed. But Emerson was claiming no more than the recognition of America as an independent culture within the broad bounds of what one is obliged to call "Western" civilization. Since Emerson's day, civilizations as well as cultures have commingled, and the world's problem now is one much more of understanding than of independence.

It was suggested to me that I should speak on the Chinese scholar, and I could not but agree that it would be a subject wonderfully suitable to the tradition of this occasion; but after serious thought I realized that it would have to be on the Chinese painter that I should speak.

There has never been a definition of the word *shih*, or "scholar," in Chinese. The original meaning of *shih* is obscure and even ambiguous, though of great antiquity.

The ideographic structure of the Chinese written language, which has remained distinct from the spoken language, caused and still causes difficulty to would-be learners. Those persons in the early days of Chinese civilization who were able to read and write gained an immediate advantage over the rest. What they read was the Confucian Classics and what they wrote about was the Confucian Classics; in consequence they were dubbed, rightly or wrongly, "Confucian scholars." This has debased the Chinese word *shih*. The standard set by Confucius was very high. He taught that a scholar was a superior man, a true gentleman, meaning thereby not that he must be well born but that he must be superior in character and behavior, taking the right as his material and ritual as his guide in giving it expression. Though every literate Chinese was versed in the Confucian Classics and aimed to be a true gentleman, how very few reached the goal in the course of over two thousand years!

To my mind, those who clearly deserved the name of "scholars" and "gentlemen" were our poets and painters. We recognize the true Confucian qualities in their works. Poetry and art, particularly pictorial art, are the chief flowers of Chinese civilization. It is through them that Chinese civilization has been brought to the notice of the rest of the world and come at length to be recognized, admired, and

industriously studied, no longer out of curiosity but for their own sake.

To understand Chinese poetry one requires, of course, a knowledge of the Chinese language; and that, owing to the language's tonal and monosyllabic nature, has hindered Chinese poets of later periods from further development of their art, while to foreigners it has proved an all but insuperable barrier.

The painters were, however, in much happier case. Art is pictorial and international. The eye has no languages like the tongue. The masterpieces of Chinese painting have introduced Chinese civilization to the western hemisphere.

For this reason I have felt justified in choosing "The Chinese Painter" for my subject.

My oration will be trifling beside that of Emerson, but some strangely exact coincidences in our lives embolden me to mention my name with his. Emerson was born in 1803; I, in 1903. Emerson set foot in England for the first time in 1833; I reached London from China in 1933. At that point we diverge. Emerson did not stay long in England; he did not need to learn a new language, and he saw little in England that he could not see in his own America. He felt that American writings were not recognized by the English as something distinct from their own, just because they were written in the same language, and he returned to America to stress the distinct qualities of the American scholar. I remained in England for over twenty years, with occasional visits to America and other countries. Nearly everything was new to me, and I was hungry for information. I applied myself to learning the English language with all the intensity I possess. The more things besides the language I learned, the more new things came my way. Repeatedly I got myself confused by my own enthusiasm. By and by I saw new things more clearly. I began to find myself turning into a modern man. A modern man, to my way of thinking, is a product of mixed cultures. Basically I am body and soul Chinese, but my twenty years' stay in England and my contacts with other parts of the world have brought me some understanding of occidental cultures. I have found myself readily accepted, and not as an interesting heathen but as a fellow human being who may have something to contribute. Time has wrought the change. Only in recent years have peoples ceased to look upon each other as peculiar. I am happy to have been born exactly a hundred years later than Emerson. Through my study of Western civilization and

modern art, no matter how little I may know of them, I see the Chinese painter playing his part in the evolution of the civilization of the world. My theme is to examine the possibility that Chinese pictorial art will interweave itself with the world art of the future and the word "Chinese" as applied to a painter become a mere qualification of birthplace.

The Chinese painter of the past was, as I have said, a true scholar. All the great masters of the past were versed not only in the Confucian Classics but also in other Chinese philosophies, particularly Taoism and Ch'an Buddhism. Chinese art, as I see it, has a history similar to that of Western art. From the designs of the bas-reliefs of Han tombs and also from Han lacquers since the third century B.C., we can see that painting was used at that time as a means of illustrating Confucian stories and legends. The sculptures and paintings created from the Wei dynasty of the fourth century down to the end of the T'ang dynasty in the tenth century show Chinese pictorial art in the service of the Buddhist religion. Although a number of outstanding painters had already freed themselves from moral and religious obligations, it was not until the Sung dynasty that painting as an independent form of fine art, concerned for example with birds, flowers, insects, and others of Nature's creatures, as well as with landscape, came into being. This nature-painting did not spring from any scientific study of nature, but developed out of Chinese nature-poetry and nature-prose. A great masterpiece of Chinese painting was thus distilled from a blend of philosophies, poetry, calligraphy, and the highly individual Chinese mediums. The Chinese painter of the past was not merely a painter – he had to be also a scholar, a thinker, a poet, and a calligrapher.

Being a thinker, or an exponent of Man Thinking, as Emerson defined "the scholar," the Chinese painter aimed to identify his mind with the subject he worked on. Chinese philosophies, particularly Taoism, teach that a man has two selves: the Great Self, or Soul, and the Small Self, or Body. The Small Self keeps one busy with material things and may cause self-assertion, bias, and restricted understanding. The Great Self is free, not constrained by logic or ethics or man-made laws. It lives in simplicity and harmony and sees life as a whole. When this wholeness of outlook is attained, one is a true man with a free soul. The Chinese painter of the past trained himself to be a true man with a free Great Self, through which to see the "Secret of Life" in Nature as a whole. Man and other creatures in Nature became

equals. In the eyes of Chinese painters, everything in Nature has been a living thing possessing the capacity for passion, sympathy, anger, and poignant feeling. Unlike the traditional art of the West, which has predominantly represented Man, Chinese painting has not necessarily chosen to depict human beings. The Sung masters painted freely and naturally as their mind's eye saw, always attempting to engender a mood in which they could identify themselves with the theme of their work. In this way the artistic presentation of Chinese painters of the past was tolerant, impartial, impersonal, perpetual, and eternal. These men wished to make themselves intensely conscious of the existence of other creatures, not only of other peoples outside China. This is why Chinese painting has a universal appeal. It seldom depicted human agony, or human entanglements, or abstract thought. It took just the simple things which could be seen in man's daily life.

Among all types of Chinese nature-painting, landscape was always esteemed the highest. Man and the doings of man are included in the vastness of Nature; the whole is greater than the parts. The oneness of the Chinese painter's soul with Nature cannot be better seen than in the landscape painting, the greatness of which lies in its absolute tranquillity, the result of the rich activity in the artist's soul. It is soul-revelation which makes a masterpiece ageless, unbounded by race or creed; universal. Many Sung masters were great thinkers.

The Chinese painter of the past was often a poet. This was because his aim was to convey an atmosphere, a poetic truth of Nature's creatures or of Nature's scene. Chinese poetry is an unexplainable mixture of the apparently concrete and definite with the thoroughly elusive and intangible. The same is true of Chinese painting. The perfection of either is its subtle revelation of a poignant, intimate feeling for the beauty of nature or for the beautiful way of life of the creatures in Nature. It is simple and seldom exaggerated; the intimate feeling for nature does not stand overemphasis. The Chinese poet wrote a mood, while the Chinese painter painted it. Since the Sung dynasty, Chinese painters have been primarily concerned, not with planes, pigments, solids, the effects of light, the influence of color upon form, and other such problems, but with the expression of a poetic mood of Nature. It was in the poetic mood, in an almost ecstatic vision of reality, that he tried to capture Nature's forms. When his eye saw and his mind conceived simultaneously, then he picked up the brush and transferred his imaginative scene to paper or silk in the same way that the poet did in a group of words. Not only that; he

often added an inscription to his work, usually itself a poem. We have a phrase: "In painting there is poetry; in poetry there is painting."

The Chinese painter of the past was normally a calligrapher as well; for Chinese calligraphy and painting have been sister arts all their lives. The earliest Chinese writing was a form of picture; the latest Chinese painting was a form of written thought. In fact, Chinese painting was derived from China's ancient scripts, which were ideographic and gradually evolved into the present forms of Chinese calligraphy. The beauty of Chinese calligraphy is the beauty of graphic movement, not of designed and motionless shape. A line in Chinese calligraphy is executed with a single stroke of the brush. It is the same with Chinese painting, for the Chinese painter paints in exactly the same way as the calligrapher writes – with the same brush, the same ink, and the same paper or silk. Brushwork is of the first importance in the eyes of Chinese art critics. It is upon the powerful manipulation of the brush, the living movement of the strokes, the strength, harmony, cohesion of all linear elements, that an artist's reputation depends. Brushwork is not merely a technique but is bound up with many elements – taste, learning, mental discipline, and sensitive judgment, to name but a few.

Following the example set by the Sung masters, Chinese painters have ever since been expected to be men of taste, men who subject themselves to a discipline first of the mind and then of the hand. It has long been a commonplace of Chinese art criticism that a painter, if he is to succeed in his art, must "travel ten thousand miles and study ten thousand books." He must read the great books of his own country. Nature teaches his eye to observe forms and his heart to feel them. Chinese philosophies urge him to disregard display of human glory and instead to extract from natural scenery the transcendent spiritual power which governs all things. By cultivating and enriching his mind he will find infinite gradations of meaning in appearance. Nature herself grows rich for him in response. In the very greatest Chinese masterpieces that have survived for us to look at, we are immediately aware of a gentle, harmonious contented, tranquil feeling, a feeling which can be achieved only when its creator has freed himself from disturbing emotions. A calm and balanced mind is the first requisite of the creative imagination of China.

The Chinese painter of today, though trained in the traditional methods and following in the conventional manner, has temporarily lost this calm and balanced mind. This is understandable, for Chinese

culture met a direct challenge from other cultures only within the last hundred years. It is still in the process of adjusting itself to this challenge. The first impact between the Western and Chinese cultures was so fierce, and evolved so many misconceptions, that cultured Chinese became disillusioned about their own heritage. Our native thought, particularly Confucianism, which was still molding the Chinese mind within the frame of the Moral Law, was shaken to its foundations. Nothing arose to take its place. Materialism began to enslave the Chinese mind. The Small Self took control. And the contemporary Chinese painter has been disturbed not only in his mind's eye but also in his hand's discipline. His predecessors saw no pictorial art but Chinese and knew no other way of depicting thoughts and ideas than the traditional one. In the seventeenth and eighteenth centuries Jesuit priests brought examples of Christian art to China in the form of statuettes and prints, and these created something of a stir, mainly because the three-dimensional technique was novel, as were the photographic likeness to the object, the perspective and chiaroscuro (light and shade), and the colors. But the influence of Jesuit painters did not extend much beyond the imperial palace, for many of them were made court-painters and their followers were for many reasons few. The attraction of their work lay in a technical difference which did not seem to impinge upon the old Chinese esthetic theories. Many good Chinese painters paid little attention to them. Actually, these European painters in China were far more affected by the Chinese they lived among than were the Chinese by the Europeans. And in any case these Jesuit painters, good as they were in their way, were not the best possible representatives of Western art.

At the beginning of the twentieth century, Chinese students began to go abroad to acquire modern knowledge, chiefly on scientific subjects. Later on young Chinese came to Paris and other Western cities for the express purpose of studying art. These soon styled themselves "modern" Chinese painters and claimed to have nothing to do with Chinese traditional artistic renderings. After their return, in order to make themselves known to the public (a vice which it is legitimate to say they learned in the West), they depreciated Chinese traditional paintings, even works by Sung masters, for their lack of perspective and chiaroscuro. None of them, of course, could afford to buy the smallest examples of Western art to bring back to China, even if they had the discrimination to choose good ones. What they

brought back were a few cheap plaster of Paris casts of Western sculptures and a number of badly reproduced prints. By exhibiting these with their own works in oil, pencil and chalk – and exhibitions of any kind were then a very new thing in China – they made a big stir, comical as it may sound now. They attached great importance to the study of the nude, and this at once raised strong opposition from the ardently Confucian-minded. A warrant was issued for the arrest of one returned traveler from Paris who had managed to find one live model for his newly established art school in Shanghai. Nevertheless, many budding artists supported the new ideas. While in the West painters like Daumier, Delacroix, and Manet were no longer concerned with achieving a "likeness" between the thing painted and its portrayal and were thinking it superfluous for a picture to be "lifelike," young Chinese painters had only just realized the possibilities of "lifelike" paintings in the traditional Western manner. This helped to confuse the Chinese mind at the time. When more level-headed Chinese men of letters and painters came to the West and stayed long enough to learn about the Impressionists and Post-Impressionists, they realized that Western art included pictures having affinity with their own art, though the Impressionists used color, while monochrome had always been the chief medium in China. But they still found puzzling the different schools of art of the West, such as the Gothic, Romantic, Expressionist, Fauvist, Cubist, and Surrealist. In Chinese pictorial art there had never been any division; the names, Northern School and Southern School, signified no difference of artistic approach.

In respect to the abstract beauty of line and the appreciation of well-executed form, there would be to the Chinese, with their long calligraphic tradition, nothing startling in Western art. But Surrealism and other modern art schools in the up-to-date West intended something much more. André Breton's definition of Surrealism is "thought's dictation, all exercise of reason and every esthetic or moral preoccupation being absent." Some modern Western painters exalted "automatic creation"; that is to say, the creation of pictures while in the state of something like trance, with accident given free play through the subconscious mind. This made many contemporary Chinese painters feel not merely confused but lost, though a few purported to join the movement. Unlike perspective and chiaroscuro, which had offered a direct challenge to traditional Chinese painting several decades before, the modern art of the West, stressing the

activity of the subconscious mind, disregarded the Chinese conception of art altogether.

While Einstein's fourth dimension, "time," altered the general outlook on the universe, the work of another great innovator, Sigmund Freud, changed man's conception of himself. Freud rejected the notions on which early civilization was based, notions of steady progress in manners, mentality, customs, and the arts. Both Einstein and Freud exercised great influence on our age of the twentieth century, but Freud had a more direct effect. It is he perhaps who is responsible for much of the modern artistic expression of the West. Freud's psychoanalysis has not yet spread over China, but this does not mean that there is no subconsciousness in the Chinese mind. The Chinese painter of today feels that he is an outcast in the modern art world, yet is fully aware of his country's part in the evolution of world civilization. That is his dilemma.

Nothing is easier or more dangerous than generalization. The influence of Freudianism on modern art in the West cannot be denied, but it would be wrong to say it has been the only powerful influence. There are no differences of beauty and artistic value between the two hemispheres. Freudianism brought a drastic change which made Chinese painting, still wearing its traditional garment, look static and unprogressive. The curious fact is that despite the unpromising cleavage between the modern art of the West and Chinese painting, the latter has never been so much appreciated as or studied with deeper understanding than it is now in the West. This suggests that there is some permanent factor or value in Chinese painting which is not alien to the trend of even modern Western art. Or shall I say that the trend of modern Western art is actually toward the goal at which Chinese painters have been aiming all along? In short, the two arts are moving in the same direction.

I am not in a position to predict what the effect will be in China's near future. What I want to stress is the spirit of Chinese pictorial art, which, as I have said, is ageless, boundaryless, impartial, impersonal, and eternal. Chinese pictorial art long ago freed itself from the moral obligation of Confucianism and also from the religious attachment of Buddhism. Both Confucianism and the Buddhist religion center in man. Only Chinese Taoism argues that man is not the only creature in the universe, there being millions of others which share existence with him. After the development of Ch'an Buddhism and of Neo-Confucianism in close affinity with Taoism, Chinese thought becomes

one in favor of attaining harmony between Man and Nature. This is where Chinese painting has found its fullest expression. The dominant motives in Western art, whether classical or modern, are concerned with Man's love and life; the dominant motives in ancient American and other primitive art are centered in Man's fear and death; but Chinese art, particularly Chinese painting from the tenth century, is concerned neither with love nor with fear. It simply reveals the artist's true self, his Great Self.

The Chinese think that art and life are inseparable but that art is neither the servant of life nor a by-product of it. Through art, life makes direct contact with Nature. Thus, art is something more than life for man. Art can help to make life happier and more pleasant; therefore it cannot be a mere expression of either the conscious or the subconscious mind, for those only explain life and do not enhance it.

No culture has ever mastered the whole of human nature. The same is true of art. A work of art is the conversion of an idea into an image. *Art pour l'art* has no meaning. Life is not to be found outside Nature, and it is necessary to be in harmony with Nature before one's mind can swing in the peaceful rhythm of life. The mind has more facets than the largest and most intricately cut diamond, and the Small Self is present in all of them, ever working its own ends, which are not those of art. Thus the Great Self, the creator of art, is obscured or pushed aside. The Small Self can produce art, but one-sided art, not great art. The art produced by the conscious mind alone is tied to physical obligation, to the "lifelike," and to morality and religion. The art of the subconscious mind alone tends to be out of normality, fantastic, and easily descends to nothingness. "Automatic creation" may furnish subjective revelation but seldom art. The Great Self, being impersonal, is similar from man to man and similar also to the Great Self of other creatures in Nature. Difference lies in the Small Self. To reveal one's soul in art requires cultivation of the Great Self.

In Chinese esthetic theories, form, technique, color, and mediums are only the means of art. The artist's Great Self is the master. So long as the master is present, with the power to reveal himself, the means he employs neither weaken nor strengthen the result. That is why Chinese painting came to be executed with the fewest possible mediums – brush, ink, and paper or silk. The assistance of color and chiaroscuro were seldom required for our Sung masterpieces.

Great art speaks for itself. It is not necessary to be classified into different schools; it needs no label. And explanation is superfluous. Real art does not live for a day. It must be agreeable to all minds' eye in all places in all ages. It must survive the test of time and the critical gaze of "hungry generations," and there must be something in it for all humanity. Lacking this something, it is decorative or ornamental and may be liked and copied. Mere difference in form and technique cannot make it great.

The poetic truth of Man and of Nature has been the aim of Chinese painters of the past. In my opinion it should be the aim of Chinese painters of today and of the future. I do not of course suggest that the Chinese alone possess this poetic truth. It belongs to every people of the world. Let us then, in connection with art, have done with the talk of superiority and inferiority, of Occidental and Oriental, of patriotism and nationalism. It is impossible for one culture to hold itself apart from the rest in this modern age of ours. The means available for the transmission of thought, idea, and art are today so many and so swift that even Eskimos have little excuse for cultural isolation. We modern men are the products of the crossing of cultures, and it does not become us to make much of our differences. Beneath the schools and techniques lies the poetic truth of Man and of Nature, the basis of all civilization. Our goal is different from Emerson's. It is civilization, rather than national culture, for which recognition is needed.

Records of Meetings

10–11 January 1956 – Stated Meeting

The One Thousand Three Hundred and Eighty-Seventh Meeting was designated "a celebration in honor of the Anniversary of the 250th birthday of Benjamin Franklin, who was elected a Fellow of the Academy one hundred and seventy-five years ago." The meetings were divided into three sessions:

Session A. *Our Fellow Member, Benjamin Franklin, A.M., LL.D., D.C.L., F.R.S.*, Chairman, David McCord. This session was held on Tuesday evening, 10 January 1956, at 8:30 P.M. in the Lamont Library Forum Room, Harvard University. Morris Bishop of Cornell University, introduced by Howard Mumford Jones, delivered the Communication, *Franklin in France*, which appears on pp. 214-230 of this issue of *Dædalus*.

Session B. *Symposium on Atmospheric Research*, Chairman, Henry G. Houghton. This session was divided into morning and afternoon meetings on 11 January 1956, held in the Little Theatre of the Kresge Auditorium of the Massachusetts Institute of Technology, in recognition of the interests of our one-time Fellow in the electrical and other phenomena of the atmosphere.

Morning meeting—9:00 A.M. *Atmospheric Electricity*, Chairman, Dr. Henry G. Houghton, Professor of Meteorology, MIT. *The Electrification of Cloud and Raindrops*, Dr. Ross Gunn, Director of Physical Research, U. S. Weather Bureau, Washington, D. C. *The Formation of Electric Charges in Thunderstorms*, Dr. Joachim P. Kuettner, Geophysical Research Directorate, Air Force Research Center, Bedford, Mass. *Positive Streamer Sparks in Air in Relation to the Lightning Stroke*, Dr. Leonard B. Loeb, Professor of Physics, University of California, Berkeley.

Afternoon meeting—2:00 P.M. *The Upper Atmosphere*, Chairman, Dr. Harlow Shapley, Professor of Astronomy, Harvard University. *A Meteorologist Looks at the Upper Atmosphere*, Dr. Harry Wexler, Chief of Scientific Services, U. S. Weather Bureau, Washington, D. C. *Astronomical Phenomena of the Upper Atmosphere*, Dr. Fred L. Whipple, Director of the Astrophysical Observatory, Smithsonian Institution, and Professor of Astronomy, Harvard University. *Phenomena of Radio Scattering in the Ionosphere*, Dr. Henry G. Booker, Professor of Electrical Engineering, Cornell University.

Session C. The Benjamin Franklin Birthday Dinner was held at the MIT Faculty Club at 7:00 P.M., 11 January 1956. The President was in the chair.

There were present 57 Fellows and 93 guests.

The regular business of the Academy Meeting was tabled with the following exceptions:

On recommendation of the Council, it was voted: to amend the Statutes, Chapter XI, Article 1, Paragraph 1, on election of members to standing committees, by deleting the last sentence, "A Fellow shall not be eligible for election for two successive terms," and substituting for it: "A Fellow may not be nominated for successive terms without the specific consent of the Council."

A recently elected Fellow was introduced: Mr. Roland Hayes (IV:4).

Announcement was made of a further meeting honoring the 250th anniversary of Franklin jointly with the 200th anniversary of Mozart, when, under the chairmanship of Mr. Biggs of the Franklin Committee, a program of music will be presented.

Announcement was made of the publication of a volume, under the direction of Mr. Whitehill of the Franklin Committee, constituting a selection of issues of the *New-England Courant* containing writings of Benjamin Franklin.

At this meeting the Academy was presented with a Franklin Medal, one of 50 coined by order of the 84th Congress of the United States for presentation in honor of the 250th anniversary of his birth to scientific and philosophical societies with which Benjamin Franklin had connections.

The President turned the meeting over to the Toastmaster, Harlow Shapley, who presented the after-dinner speakers. Dr. I. Bernard Cohen, Harvard University, delivered the first Communication, *Franklin and the Twentieth Century*. The second speaker, Dr. Carleton Sprague Smith of the New York Public Library, presented the Communication, *Franklin and Music*.

The meeting was dissolved at 10:15 P.M.

8 February 1956 — Stated Meeting

The One Thousand Three Hundred and Eighty-Eighth Meeting of the Academy convened in Morse Auditorium, Boston Museum of Science, Boston, on 8 February 1956 and was called to order by the President at 8:25 P.M.

There were present 42 Fellows and 44 guests.

The records of the meetings of 14 December 1955 and 11 January 1956 were read and approved.

The President reported on the activities of the Committee on Permanent Quarters, his appearance on behalf of the Academy before the United States Senate Judiciary Subcommittee on Immigration and Naturalization on 1 December 1955 and on the plans for a concert at the April meeting of the Academy.

Sir Geoffrey Taylor, a visitor from England, was introduced by Mr. Hunsaker.

Mr. Coryell suggested that there should be further discussion by the Academy at some time on the matter of the Academy's relation to political affairs, which was discussed at the meeting on 14 December 1955.

The following Communication was presented:

Bradford Washburn: *Equipment of the Exploratory Mountaineer.*

The meeting was dissolved at 10:15 P.M.

14 March 1956 – Stated Meeting

The One Thousand Three Hundred and Eighty-Ninth Meeting of the Academy convened in Morse Auditorium, Boston Museum of Science, Boston, on 14 March 1956 and was called to order by the President at 8:15 P.M.

There were present 33 Fellows and 33 guests.

The records of the meeting of 8 February 1956 were read and approved.

The Secretary reported that the Council had approved eighteen grants-in-aid from the Permanent Science Fund totaling $12,635 and one grant of $175 from the American Association for the Advancement of Science, Academy Research Grants in New England.

It was voted to defer action on appropriations for the fiscal year beginning 1 April until the May meeting.

The following new Fellow was introduced: Wilfred Stanley Lake (III:4).

Mr. A. Baird Hastings presented foreign guests: Professor and Mrs. Shimagoto of the University of Tokyo.

The President announced the meeting on 28 March–the opening session of the International Commission of Optics Congress–to

which all Fellows of the Academy are invited. The Academy is local host to the Congress, which meets from 28 March to 3 April. The Scientific communication of this session will be given by Professor Doctor Frits Zernike, Nobel Laureate in Physics, from the University of the Netherlands, entitled *The Latest Wave of Physical Optics.*

The President reported on the numerous problems involved in the manufacture of a reproduction of the Franklin Glass Armonica for the concert on 11 April.

The meeting was adjourned at 8:28 P.M.

The President called upon Dr. J. H. Means to introduce the speaker.

The following Communication was presented:

Chester S. Keefer: *The Government and Problems of Medicine.*

The meeting was dissolved at 9:40 P.M.

11 April 1956 – Stated Meeting

The One Thousand Three Hundred and Ninetieth Meeting of the Academy convened in Kresge Auditorium, Massachusetts Institute of Technology, Cambridge, on 11 April 1956 and was called to order by the President at 8:30 P.M.

As the meeting was devoted to a concert of chamber music by Benjamin Franklin and Wolfgang Amadeus Mozart, formal business was dispensed with. The President immediately introduced E. Power Biggs, the text of whose communication, *Benjamin Franklin and the Armonica,* was printed in the concert program and is reprinted on pp. 231-241 of this issue of *Dædalus.*

Mr. Biggs, who played the musical glasses, the glass armonica and organ, was assisted by Roland Hayes, tenor, Richard Burgin and Ruth Posselt, violins, Eugene Lehner, viola, Alfred Zighera, violoncello, Doriot Anthony Dwyer, flute, Ralph Gomberg, oboe, and Reginald Boardman, piano, in presenting the following program:

WOLFGANG AMADEUS MOZART [1756-1791]

Fantasia in F minor for Organ, K. 594
Adagio - Allegro - Adagio

Concert Aria – *Per pietà non ricercate*

Quartet in D major, No. 18
Allegretto - Menuetto - Adagio - Allegro

Entr'acte: Divertimenti for the Glass Armonica

Minuet, from Miss Ford's Instruction Book

Captain Pockrich's " Joke," Traditional Irish Air

Adagio for the Armonica, K. 356, WOLFGANG AMADEUS MOZART

WOLFGANG AMADEUS MOZART

Adagio and Rondo for Armonica, Flute, Oboe, Viola and Cello, K. 617 (played on the Schlicker " Portativ ")

BENJAMIN FRANKLIN [1706-1790]

Three Lyrics by Franklin

My Plain Country Joan, Setting by Ross Lee Finney

Wedlock as old men note (Poor Richard), Setting by Ross Lee Finney

The Mother Country, Music by Thomas Arne, arranged by E. S. Phelps

BENJAMIN FRANKLIN

Quartet in F major " The Open String Quartet "

Intrata - Menuetto - Capriccio - Menuetto - Siciliano

WOLFGANG AMADEUS MOZART

Four Sonatas for organ and instruments

Sonata in C major, K. 336 - *Allegro*

Sonata in E flat major, K. 67 - *Andante*

Sonata in G major, K. 274 - *Allegro*

Sonata in C major, K. 329 - *Allegro*

9 May 1956 — Annual Meeting

The One Thousand Three Hundred and Ninety-First Meeting of the Academy convened at the Boston Museum of Science, Science Park, on 9 May 1956, and was called to order by the President at 8:15 P.M.

There were present 66 Fellows and 66 Guests.

The records of the Meeting of 11 April were read and approved.

Annual reports were received as printed below.

Upon recommendation of the Council it was voted that the assessment for the fiscal year beginning 1 April 1956 be $15.00 for resident Fellows and $5.00 for nonresident Fellows.

Upon motion by the Council it was voted that the following appropriations be made from the General Funds for the fiscal year beginning 1 April 1956:

1.	Salaries, Pensions, and Annuities	$18,461
2.	General Administration	6,500
3.	Fire Insurance	100
4.	Quarters	1,500
5.	President's Expense	500
6.	Treasurer's Expense	900
7.	Investment Custodian Account	1,000
8.	International Relations Committee	500
9.	School Science Committee	300
10.	Franklin Anniversary Committee	1,500
11.	Publication Committee	5,900
		$37,161

The Treasurer listed the following amounts available to the Special Funds by adding to their balances as of 31 March 1956 the expected income of these funds during the year ending 31 March 1957:

1.	Amory Fund	$ 9,377.46
2.	Permanent Science Fund	29,210.07
3.	Publication Account (exclusive of $5,900 appropriation from General Funds)	10,122.42
4.	Rumford Fund	15,605.83
5.	Warren Fund	3,890.86
		$68,206.64

Upon recommendation of the Council ninety-six new Fellows and six new Foreign Honorary Members were elected as listed below.

The ballots for the annual election of officers and committees were distributed and it was voted that the Secretary cast one ballot for the slate presented by the Nominating Committee as listed below.

A poll showed that about nine out of the 132 persons present had come by public transportation.

On recommendation of the School Science Committee the President presented eight Elizabeth Thompson Science Fund awards for outstanding teaching in science and mathematics in the secondary schools in New England, as follows:

Malcolm D. Campbell, Dorchester High School, Boston, Mass.

Dorothy W. Gifford, Lincoln School, Providence, R. I. (*in absentia*)

Lorne F. Lea, St. Paul's School, Concord, N. H.

Clifford Nelson, Weeks Junior High School, Newton Centre, Mass.

Joseph H. Rohloff, Aldrich High School, Warwick, R. I. (*in absentia*)

Marco Scheer, Nashua High School, Nashua, N. H.

Sister Mary Walter, Our Lady of Perpetual Help School, Roxbury, Mass. (*in absentia*)

Claiborne H. Young, Plymouth High School, Plymouth, Mass.

With Mr. Talcott Parsons as Chairman, there was a Forum on "Russian Science Education" with the following speakers:

Alexander Korol, Center for International Studies, M.I.T.
Science and Technology in the Soviet Secondary Schools

Leon Trilling, Aeronautical Engineering, M.I.T.
Education and the Soviet Aircraft Industry

M. H. Trytten, Office of Scientific Personnel, National Research Council
America Looks at Soviet Education

The Meeting was dissolved at 10.50 P.M.

WILLIAM C. GREENE, *Secretary*

Report of the Secretary on the Status of the Membership

1955–1956

I regret to have to report the following deaths: Twenty-three Fellows and six Fellows Emeriti—Adelbert Ames, Jr. (I:2), Raymond Clare Archibald (I:1), John Howard Benson (IV:4), Robert Payne Bigelow (II:3), Arthur Alphonzo Blanchard (FE I:3), Charles Thomas Brues (FE II:3), David Cheever (FE II:5), William John Crozier (II:4), Walter Fenno Dearborn (FE III:1), Louis Herbert Gray (IV:3), Archer Milton Huntington (IV:4), Carl Tilden Keller (IV:2), Elmer Drew Merrill (FE II:2), Gerrit Smith Miller, Jr. (II:3), Carl Richard Moore (II:3), Charles Rufus Morey (IV:4), Greenleaf Whittier Pickard (I:6), Joseph Hersey Pratt (II:5), Herbert Putnam (III:5), George Sarton (FE IV:2), George A. Sloan (III:5), Huntley Nowell Spaulding (III:5), Henry Crosby Stetson (I:5), James Batcheller Sumner (II:1), Louis Leon Thurstone (II:4), Sarah Wambaugh (III:3), Karl Ephraim Weston (IV:4), Robert Williams Wood (I:2), Robert Mearns Yerkes (II:4). Five Foreign

Honorary Members–Rafael Altamira y Crevea (IV:2), Henry Clay (III:2), B. Seebohm Rowntree (III:1), Meghnad N. Saha (I:2), Claus Hugo Hermann Weyl (I:1).

Two Fellows have been classed as Emeriti as of May 1955: Otto Oldenberg (I:2), Ralph Chillingworth Yound (I:3). Two Fellows have been classed as Emeriti as of May 1956: Joseph Hudnut (IV:4), Arthur Hiler Ruggles (II:5).

One Fellow has been reinstated by the Council: Glennon Gilboy (I:6).

In May, 1955, sixty-nine Fellows and four Foreign Honorary Members were elected to the Academy; all except one accepted election.

The roll now includes 1101 Fellows, 57 Fellows Emeriti, and 143 Foreign Honorary Members (exclusive of those elected tonight).

WILLIAM C. GREENE, *Secretary*

New Members Elected 9 May 1956

FELLOWS

Total elected, 96

CLASS I – MATHEMATICAL AND PHYSICAL SCIENCES – 26

SECTION 1 – *Mathematics* – 4

Andrew Gleason	Harvard University, Cambridge, Mass.
Sydney Goldstein	Harvard University, Cambridge, Mass.
Maurice Haskell Heins	Brown University, Providence, R. I.
Lynn Harold Loomis	Harvard University, Cambridge, Mass.

SECTION 2 – *Physics* – 6

Lloyd Viel Berkner	Associated Universities, Inc., New York, N. Y.
Nicolaas Bloembergen	Harvard University, Cambridge, Mass.
Walter Houser Brattain	Bell Telephone Laboratories, Inc., Murray Hill, N. J.
Bernard Taub Feld	Massachusetts Institute of Technology, Cambridge, Mass.
Gerald James Holton	Harvard University, Cambridge, Mass.
Henry DeWolf Smyth	Princeton University, Princeton, N. J.

SECTION 3 – *Chemistry* – 5

George Hermann Büchi	Massachusetts Institute of Technology, Cambridge, Mass.
Saul Gerald Cohen	Brandeis University, Waltham, Mass.
Albert Sprague Coolidge	Harvard University, Cambridge, Mass.

Herman Francis Mark — Polytechnic Institute of Brooklyn, Brooklyn, N. Y.
David Powell Shoemaker — Massachusetts Institute of Technology, Cambridge, Mass.

Section 4 — *Astronomy* — 1

Leo Goldberg — University of Michigan, Ann Arbor, Mich.

Section 5 — *Earth Sciences* — 4

Charles Alfred Anderson — Geological Survey, Washington, D. C.
Victor Paul Starr — Massachusetts Institute of Technology, Cambridge, Mass.
Henry Bradford Washburn, Jr. — Boston Museum of Science, Boston, Mass.
Harry Wexler — Weather Bureau, Washington, D. C.

Section 6 — *Engineering Sciences and Technologies* — 6

Michael Berliner Bever — Massachusetts Institute of Technology, Cambridge, Mass.
Melville Eastham — General Radio Company, Cambridge, Mass.
Harold Eugene Edgerton — Massachusetts Institute of Technology, Cambridge, Mass.
Antoine Marc Gaudin — Massachusetts Institute of Technology, Cambridge, Mass.
Warren Max Rohsenow — Massachusetts Institute of Technology, Cambridge, Mass.
Leslie Earl Simon — United States Army, Washington, D. C.

CLASS II — Biological Sciences — 25

Section 1 — *Biophysics and Biochemistry* — 4

Lewis Libman Engel — Massachusetts General Hospital, Boston, Mass.
Jordi Folch-Pi — Harvard Medical School, Waverley, Mass.
Oscar Hechter — Worcester Foundation for Experimental Biology, Shrewsbury, Mass.
Arthur Kaskel Solomon — Harvard University, Cambridge, Mass.

Section 2 — *Botany and Bacteriology* — 4

Vernon Irvin Cheadle — University of California, Davis, California
Ivan Mackenzie Lamb — Harvard University, Cambridge, Mass.
Frederick Campion Steward — Cornell University, Ithaca, N. Y.
Albert Franklin Yeager — University of New Hampshire, Durham, N. H.

Section 3 — *Zoology* — 4

Min-Chueh Chang — Worcester Foundation for Experimental Biology, Shrewsbury, Mass.
Charles Peirson Lyman — Harvard University, Cambridge, Mass.
Bryan Patterson — Harvard University, Cambridge, Mass.
Elizabeth Buckley Shull Russell — Jackson Memorial Laboratory, Bar Harbor, Maine

Section 4 — *Physiology and Experimental Psychology* — 6

Mary Agnes Burniston Brazier	Massachusetts General Hospital, Boston, Mass.
Dwight Joyce Ingle	Billings Hospital, Chicago, Ill.
Karl Harry Pribram	Institute for Living, Hartford, Conn.
Curt Paul Richter	Johns Hopkins University, Baltimore, Md.
Harold Schlosberg	Brown University, Providence, R. I.
Heinz Werner	Clark University, Worcester, Mass.

Section 5 — *Medicine* — 7

John Englebert Dunphy	Harvard Medical School, Boston, Mass.
Joseph Marchant Hayman, Jr.	Tufts University School of Medicine, Boston, Mass.
Chester Morse Jones	Harvard Medical School, Boston, Mass.
William Gordon Lennox	Children's Hospital, Boston, Mass.
Joe Vincent Meigs	Harvard Medical School, Boston, Mass.
Reidar Fauske Sognnaes	Harvard School of Dental Medicine, Boston, Mass.
James Clarke White	Harvard Medical School, Boston, Mass.

CLASS III — Social Arts and Sciences — 30

Section 1 — *Social Relations* — 4

George Caspar Homans	Harvard University, Cambridge, Mass.
Carl Iver Hovland	Yale University, New Haven, Conn.
Robert Richardson Sears	Stanford University, Stanford, Calif.
Robert Winthrop White	Harvard University, Cambridge, Mass.

Section 2 — *Economics* — 6

Morris Albert Adelman	Massachusetts Institute of Technology, Cambridge, Mass.
Harold Adolph Freeman	Massachusetts Institute of Technology, Cambridge, Mass.
Alexander Gerschenkron	Harvard University, Cambridge, Mass.
Ben William Lewis	Oberlin College, Oberlin, Ohio
Guy Henderson Orcutt	Harvard University, Cambridge, Mass.
Robert Merton Solow	Massachusetts Institute of Technology, Cambridge, Mass.

Section 3 — *Political Science* — 1

Robert Kenneth Carr	Dartmouth College, Hanover, N. H.

Section 4 — *Law* — 9

Robert Richardson Bowie	Department of State, Washington, D. C.
Kingman Brewster, Jr.	Harvard Law School, Cambridge, Mass.
Charles Fairman	Harvard Law School, Cambridge, Mass.
William James Kenealy	Boston College Law School, Boston, Mass.
Eugene Victor Rostow	Yale Law School, New Haven, Conn.
Aaron Cecil Snyder	Supreme Court of Puerto Rico, San Juan, P. R.
John Varnum Spalding	Massachusetts Supreme Judicial Court, Boston, Mass.
Samuel Edmund Thorne	Yale Law School, New Haven, Conn.
Raymond Sanger Wilkins	Massachusetts Supreme Judicial Court, Boston, Mass.

Section 5 — *Administration and Affairs* — 10

Jaime Benítez	University of Puerto Rico, Rio Piedras, P. R.
Charles Eustis Bohlen	Moscow, U. S. S. R.
Chester Bowles	Essex, Conn.
Thomas Knight Finletter	New York, N. Y.
Francis Whiting Hatch	Batten, Barton, Durstine & Osborn, Inc., Boston, Mass.
Howard Bonar Jefferson	Clark University, Worcester, Mass.
Rosemary Park	Connecticut College for Women, New London, Conn.
James J. Rorimer	Metropolitan Museum of Art, New York, N. Y.
William Edwards Stevenson	Oberlin College, Oberlin, Ohio
Stanley Ferdinand Teele	Harvard School of Business Administration, Boston, Mass.

CLASS IV — Humanities — 15

Section 1 — *Philosophy and Theology* — 5

William Foxwell Albright	John Hopkins University, Baltimore, Md.
Douglas Horton	Harvard Divinity School, Cambridge, Mass.
Stephen Coburn Pepper	University of California, Berkeley, Calif.
Morton Gabriel White	Harvard University, Cambridge, Mass.
Amos Niven Wilder	Harvard Divinity School, Cambridge, Mass.

Section 2 — *History and Archaeology* — 4

Marshall Clagett	University of Wisconsin, Madison, Wis.
Myron Piper Gilmore	Harvard University, Cambridge, Mass.
Richard Hofstadter	Columbia University, New York, N. Y.
Lynn Townsend White, Jr.	Mills College, Oakland, Calif.

Section 3 — *Philology and Criticism* — 3

Herbert Dieckmann	Harvard University, Cambridge, Mass.
Edith Fishtine Helman	Simmons College, Boston, Mass.
Albert Bates Lord	Harvard University, Cambridge, Mass.

Section 4 — *Fine Arts and Literature* — 3

Morris Gilbert Bishop	Cornell University, Ithaca, N. Y.
Chiang Yee	Columbia University, New York, N. Y.
Ludwig Miës van der Rohe	Illinois Institute of Technology, Chicago, Ill.

FOREIGN HONORARY MEMBERS

Total elected, 6

CLASS I — Mathematical and Physical Sciences — 1

Section 6 — *Engineering Sciences and Technologies* — 1

Sir Geoffrey Ingram Taylor	Royal Society, Cambridge, England

CLASS II – BIOLOGICAL SCIENCES – 1

SECTION 4 – *Physiology and Experimental Psychology* – 1

Robert Marie Jules Constant Courrier — Collège de France, Paris, France

CLASS III – SOCIAL ARTS AND SCIENCES – 2

SECTION 4 – *Law* –2

Sir Owen Dixon — Australian High Court, Melbourne, Australia
Francis Raymond Baron Evershed — London, England

CLASS IV – HUMANITIES – 2

SECTION 1 – *Philosophy and Theology* – 1

Alexandre Koyré — Sorbonne, Paris, France

SECTION 4 – *Fine Arts and Literature* – 1

Charles-Édouard Jeanneret *dit* Le Corbusier — Paris, France

Officers and Committees Elected 9 May 1956

Officers

To serve for one year

John E. Burchard, *President*
John H. Van Vleck, *Vice-President of Class I*
Hudson Hoagland, *Vice-President of Class II*
David F. Edwards, *Vice-President of Class III*
W. Freeman Twaddell, *Vice-President of Class IV*
Bruce H. Billings, *Secretary*
Thomas B. Adams, *Treasurer*
Walter M. Whitehill, *Editor and Librarian*

Councillors

To serve for four years

William C. Boyd, *II:1*
J. Walter Wilson, *II:3*
William H. Sweet, *II:5*
Thomas D. Cabot, *III:5*
Herbert Bloch, *IV:2*

Amory Prize Committee

To serve for one year

Edwin B. Wilson, *Chairman*
Bailey Aldrich
Edwin B. Astwood
J. Hartwell Harrison
Roy G. Hoskins
George W. Thorn
Shields Warren

Finance Committee

To serve for two years

William H. Claflin
William M. Rand

Permanent Science Committee

To serve for three years

John F. Enders
Patrick M. Hurley

Auditing Committee

To serve for two years

Ernest H. Huntress

House Committee

To serve for three years

José L. Sert

Committee on Meetings

To serve for two years

Garrett Birkhoff, *Class I*
Frank M. Carpenter, *Class II*

Committee on Membership

To serve for two years

Robert R. Shrock, *Class I*
Donald R. Griffin, *Class II*
Francis Keppel, *Class III*
Harold C. Case, *Class IV*

Nominating Committee

To serve for three years

Eric Reissner, *Class I*
Reed C. Rollins, *Class II*
Carl J. Friedrich, *Class III*
E. Power Biggs, *Class IV*

Committee on Publication

To serve for two years

George R. Harrison, *Class I*
Alfred S. Romer, *Class II*

Rumford Committee

To serve for three years

Norman F. Ramsey
Henry G. Houghton

Warren Committee

To serve for three years

Eugene G. Rochow
Lawrence J. Heidt

Report of the Treasurer

SCHEDULE A

BALANCE SHEET, 31 MARCH 1956

Assets

Cash in Banks and on Hand (Schedule E)		$ 28,414.54
Investments:		
General Funds (Market Value $1,362,606.02 — Schedule D)		1,033,565.60
Accounts Receivable (Dividends)		494.75
Prepaid Insurance Premiums		317.75
Total		$1,062,792.64

Liabilities

Funds (Schedule G):*		
General:		
Securities	$1,007,848.70	
Cash	368.30	$1,008,217.00
Unexpended Income (Schedule E):		
Securities, Receivables and Insurance Premiums	$ 26,529.40	
Cash	28,046.24	
Total Unexpended Income		54,575.64
Total		$1,062,792.64

* Not including principal of Permanent Science Fund, see under description of funds.

SCHEDULE B

Receipts for the Fiscal Year Ended 31 March 1956*

Academy, General:			
Investment Income (Schedule D)	$47,024.73		
Less: Income to Special Funds	23,932.09		
		$ 23,092.64	
House Credits		1,080.06	
Assessments and Admission Fees		10,030.00	
Overhead Credits		1,956.44	$ 36,159.14
The Agassiz Fund:			
Sale of 26-28 Newbury St. (5/1/55)		$215,000.00	
Sale of Furnishings		908.09	
Investment Income		9,315.00	225,223.09
Mabel S. Agassiz Fund: Investment Income			124.20
American Association for Advancement of Science			600.00
Amory Fund Committee: Investment Income			3,576.96
International Optical Congress:			
National Science Foundation		$ 10,700.00	
American Optical Firms		1,625.00	
Int. Union of Pure and Applied Physics		800.00	
Int. Commission of Optics		1,500.00	14,625.00
Kennelly Fund: Investment Income			142.83
Life Membership Fund			200.00
Monks Manuscript			200.00
National Science Foundation Grants:			
Committee on History of Government in Science		$ 7,400.00	
Committee on Acceptance of Scientific Theories		5,500.00	12,900.00
New England Courant			773.34
Permanent Science Fund:			
Boston Safe Deposit and Trust Co., Trustee		$ 16,406.97	
Investment Income		186.30	16,593.27
Publication Committee:			
Investment Income		$ 2,887.65	
Sale of Publications		2,530.72	
Lake Publications		529.36	
Other Sales		631.24	6,578.97
Publication Exchange Fund:			
Linda Hall Library			2,232.87
Rumford Fund Committee:			
Investment Income		$ 6,396.30	
Climatic Conference Publication		220.66	6,616.96
Slavic Civilization Publications			72.00
Totalitarianism Publication			3.25
Special Endowment Fund: Investment Income			17.38
Warren Fund Committee: Investment Income			1,285.47
Total Receipts (Net)			$327,924.73

* Excluding sales of securities.

SCHEDULE C

EXPENDITURES FOR THE FISCAL YEAR ENDED 31 MARCH 1956*

Academy, General:		
Salaries and Pensions, etc.	$15,514.48	
General Administration	6,105.80	
House Maintenance (3 months)	3,753.17	
Temporary Quarters and Moving Expense	2,551.22	
President's Expense	586.44	
Treasurer's Expense	937.59	
Investment Custodian Account	1,228.82	
Committee Appropriations:		
School Science	419.42	
International Relations	698.88	
Franklin Anniversary	1,009.05	$ 32,804.87
The Agassiz Fund:		
Commission and Legal Expense on Sale of 26-28 Newbury Street		9,526.24
American Association for Advancement of Science Awards		425.00
Mabel S. Agassiz Fund: For Meetings		124.20
Amory Fund:		
Awards	$24,500.00	
Publication	800.00	
Meetings Expense, etc.	916.84	26,216.84
Committee on		
Unity of Science		865.01
History of Government in Science		6,548.67
Acceptance of Scientific Theories		12,183.98
Modern World View Conference		53.63
International Optical Congress		8,812.48
Monks Manuscript		311.57
New England Courant		504.00
Permanent Science Fund:		
Awards	$14,130.00	
Expense	1,546.63	15,676.63
Publications Committee:		
Bulletins	$ 726.36	
Daedalus	3,578.09	
Proceedings	5,855.08	
Miscellaneous	87.70	10,247.23
Rumford Fund Committee:		
Awards	$ 2,315.00	
Publication	3,364.75	
Legal Expense	782.70	
Miscellaneous	384.99	6,847.44
Slavic Civilization Publications		14.40
Totalitarianism Publication		.35
Warren Fund Committee: Awards		1,000.00
Total Expenditures (Net)		$132,162.54

* Excluding purchases of securities.

Schedule D, Investments, *and Schedule E,* Cash, *are not reproduced here, but are available to Fellows upon request of the Treasurer.*

SCHEDULE F

Summary of Operating Accounts

Account	*Balance March 31 1955*	*Investment Income*	*Other Income*	*Charges Against Income*	*Balance March 31 1956*
General	.....	$23,092.64	$13,066.50	$ 36,159.14	.....
Acceptance of Scientific Theories	$ 9,173.82	.....	5,500.00	12,183.98	$ 2,489.84
Am. Assoc. for Adv. of Science	.....	.....	600.00	425.00	175.00
Amory Fund	30,065.11	3,576.96	.....	27,936.61	5,705.46
History of Government in Science	60.86	.....	7,400.00	6,548.67	912.19
International Optical Congress	.....	.....	14,625.00	8,812.48	5,812.52
Modern World View Conference	.....	.....	.....	53.63	(53.63)*
Monks Manuscript	.....	.....	200.00	311.57	(111.57)*
New England Courant	.....	.....	773.34	504.00	269.34
Permanent Science Fund Income Account	12,118.43	186.30	16,406.97	15,676.63	13,035.07
Publications — General	2,297.29	2,887.65	11,110.71	10,247.23	6,048.42
Publications — Lake	2,745.44	.....	529.36	.....	3,274.80
Rockefeller Foundation Grant	3,727.95	.....	.....	865.01	2,862.94
Rumford Fund	22,717.02	6,396.30	220.66	20,028.15	9,305.83
Slavic Civilization Publication	195.15	.....	72.00	14.40	252.75
Totalitarianism Publication	183.96	.....	3.25	.35	186.86
Validation of Scientific Theories	1,778.96	.....	.....	.....	1,778.96
Warren Fund	2,345.39	1,285.47	.....	1,000.00	2,630.86
	$87,409.38	$37,425.32	$70,507.79	$140,766.85	$54,575.64
		(Schedule B)			(Schedule E)

*Overdrafts.

SCHEDULE G

Funds

	Balance March 31 1955	*Investment Income*	*Other Receipts**	*Charges Against Funds*	*Balance March 31 1956*
General Funds:					
Regular	$ 49,848.38	.....	.....	.....	$ 49,848.38
Life Membership	5,800.00	.....	$ 200.00	.....	6,000.00
Current Expense	13,525.52	.....	3,354.27	.....	16,879.79
Barbour Fund	5,000.00	.....	.....	.....	5,000.00
Library Sale Fund	288,876.91	.....	.....	.....	288,876.91
The Agassiz Fund	.....	$9,315.00	215,908.09	$ 9,526.24	215,696.85
Mabel S. Agassiz Fund	2,000.00	124.20	.....	124.20	2,000.00
Amory Fund	53,759.70	.....	1,719.77	.....	55,479.47
Appleton Fund	17,278.39	.....	.....	.....	17,278.39
Centennial Fund	25,608.77	.....	.....	.....	25,608.77
Publication Exchange Fund	16,562.58	.....	2,232.87	3,784.00	15,011.45
Kennelly Fund	2,370.26	142.83	.....	.....	2,513.09
Rumford Fund	86,819.29	.....	13,180.71	.....	100,000.00
Special Endowment Fund	277.22	17.38	.....	.....	294.60
Warren Fund	18,405.16	.....	.....	.....	18,405.16
Investment Reserve Fund	122,384.96	.....	68,613.36	1,674.18	189,324.14
	$708,517.14	$9,599.41	$305,209.07	$15,108.62	$1,008,217.00
		(Schedule B)			(Schedule A)

*Including gains on sales of securities.

DESCRIPTION OF FUNDS

General Funds

Present Balances $49,848.38 General Fund
6,000.00 Life Membership Fund
16,879.79 Current Expense Fund

Established by various subscriptions and contributions. The income of the first two funds is available for the general purposes and maintenance of the Academy – and both principal and income of the Current Expense Fund are available if needed.

The Agassiz Fund

Proceeds from sale of Academy building at 26-28 Newbury Street in Boston, May, 1955. Present balance, $215,696.85. Unrestricted as to use of principal and income.

Mabel S. Agassiz Fund

Gift of $2,000, 1940. Income for expenses of Academy meetings.

Francis Amory Fund

Bequest, 1912. Present balance, $55,479.47. For the purpose of establishing a Septennial Prize and a gold medal to encourage the invention and discovery of measures for the relief of maladies peculiar to the bladder and the various organs connected with it. The bequest directed that public notice should be given of the nature and design of the Fund and contributions should be solicited in aid of it – also, that no award of the income be made until twenty-one years after the date of Mr. Amory's death (i.e. 1933). Four awards were made in 1940, six in 1947, and seven in 1954.

Appleton Fund

Present balance, $17,278.39. Established in 1854. The Trustees under the will of Samuel Appleton turned over to the Academy certain manufacturing stocks, of the par value of $10,000, for the purpose of constituting " a fund, the income of which is to be applied to the publication of the transactions of the said Society."

Thomas Barbour Fund

Bequest, 1947, $5,000. Unrestricted as to principal and income.

Centennial Publication Fund

Present balance, $25,608.77. Established in 1880 by gift of $1,000 from Dr. E. B. Cotting, a Fellow. Balance from subscriptions solicited by the Centennial Committee. Income is applied to publishing the transactions of the Academy.

Arthur E. Kennelly Fund

Bequest, 1939. Present balance, $2,513.09. Unrestricted as to principal and income.

LIBRARY SALE FUND

Sale Price, $320,000. May, 1946. Proceeds for general purposes of the Academy. Present balance, $288,876.91.

PERMANENT SCIENCE FUND

Balance, March 31, 1956, $386,704.31 (market value of securities $668,571.87). Fund established in September, 1928, by agreement and declaration of trust of the Boston Safe Deposit and Trust Company, acting as Trustee. Principal of Fund is held and invested by the Trustee and the annual income paid over to the Academy, semi-annually, on request.

PERMANENT SCIENCE FUND (*Income Account*)

Balance, March 31, 1956, $13,035.07. Income of the Permanent Science Fund (above) accumulated and held apart. Available for awards for scientific research on recommendation of the Committee on the Permanent Science Fund of the Academy.

PUBLICATION EXCHANGE FUND

Balance, March 31, 1956, $15,011.45.

RUMFORD FUND

Gift of Count Rumford, 1797, $5,000 in three per cent stock of the United States. Present balance, $100,000.00. Income to be applied every second year as a premium consisting of a gold medal and a silver medal " to the author of the most important discovery or useful improvement which shall be made or published in writing during the preceding two years on heat and light."

Rulings of the Supreme Judicial Court of Massachusetts in 1832 and 1955 permit one or more awards of the premium annually and the granting of sums of money in addition to the medals. They permit the residue of the income to be used for the purchase of books, papers, philosophical apparatus, making publications or procuring lecturers, experiments and investigations, thereby carrying out the general intent and purpose of Count Rumford. The decree of 1955 permits the fund or any part thereof to be invested in such funds as are legal investments for trustees in Massachusetts.

SPECIAL ENDOWMENT FUND

Gift, 1949, $200. For future development of the Academy. Balance, March 31, 1956, $294.60.

C. M. WARREN FUND

Bequest of Cyrus M. Warren, 1891. Present balance, $18,405.16. The principal is to be held at interest and the income is to be applied toward the encouragement and advancement of research in the science or field of chemistry.

THOMAS B. ADAMS, *Treasurer*

Report of the Amory Committee

The Amory Committee had one meeting during the academic year ending 9 May 1956, on 5 October 1955. The meeting was held with all of the seven recipients of the Amory Prize present to discuss the younger research workers in the field of interest of the Amory Prize who should be watched over the next few years for contributions worthy of the award of the prize for the septennium ending 10 November 1961. Several of the prizemen had suggestions to offer and others later wrote making further suggestions. The meeting was one of the most interesting that have been held.

The Committee attended the meeting of the Academy in the evening of the same day, when the Committee through its Chairman presented the seven prizemen, Frederick E. B. Foley, Choh Hao Li, Thaddeus R. R. Mann, Terence J. Millin, Warren O. Nelson, Frederick J. Wallace, and Lawson Wilkins, to President John E. Burchard for the award of the prizes. Thereafter Mr. Millin, speaking for the group, gave a highly interesting and illuminating account of their contributions and of the place of those contributions in the general field of the functioning of the reproductive system in health and disease. Mr. Millin's address appears on pages 190-205 of this issue of *Dædalus*.

The Committee notes with regret the death of Carl R. Moore on 16 October 1955. Professor Moore was an Amory prizeman of the first septennium, 1933-1940. In a biographical notice of him in "*Science*," Vol. 123, pp. 496-7, 23 March 1956, a colleague, Dr. L. R. Dragstedt, says: "Many honors came to Moore, and, among these, he probably prized most the Francis Amory Award of the American Academy of Arts and Sciences in 1941 and the Endocrine medal and award of the Society for the Study of Internal Secretions in 1955."

EDWIN B. WILSON, *Chairman*

Report of the House Committee

Although the papers on the sale of the House at 28 Newbury Street, Boston, were passed on 2 May 1955, the Academy remained there until the end of June. Temporary office quarters were set up in the Hayden Memorial Library at the Massachusetts Institute of Technology in Cambridge through the courtesy of the Institute. The

bulk of the stock of back issues of the publications, other files, and some furnishings were stored in the Metropolitan Storage Warehouse in Cambridge. Most of the remaining furnishings are stored with the Colonial Society in their house at 87 Mount Vernon Street in Boston. Some of the books and archives are stored with the Boston Athenæum. A number of minor items of the furnishings which could not be economically stored or which might have no further value for the Academy were sold, including library stacks, electrotype plates, discarded issues of back publications, filing cabinets, and refrigerators.

To round out the sequence of House Committee fiscal reports, I should put into the record that during the fiscal year beginning 1 April 1955, there was spent by the Committee a total of $3,672.81, of which $2,655.20 was for the Custodian's wages and terminal pay and for other wages. Receipts credited to the House account totaled $1,080.06, making the net expenses of the last three months of our occupancy $2,592.75. We spent a total of $1,423.52 for temporary office quarters, storage, and meeting-hall rents during the remaining nine months of the fiscal year. We also paid out $1,127.70 for moving.

The only problem of the Committee at the present time is the provision of office quarters. The space at M.I.T. will have to be given up before the end of the coming year, and it is not clear that the Academy will have a new house of its own before then. The present quarters, moreover, are overcrowded and do not permit the staff to have on hand publications and other supplies and materials that must be kept in storage elsewhere. Also, there is no space for meetings of committees or suitable hospitality for visitors.

PIETRO BELLUSCHI, *Chairman*

Report of the Permanent Science Fund Committee

The Committee met on 29 September 1955 and considered twenty-two applications for grants-in-aid of which ten, for a total of $10,251, were recommended by the Committee. These ten grants were approved by the Council on 5 October 1955, as follows:

Grants Approved 5 October 1955

(1) To Saul G. Cohen, Professor of Chemistry, Brandeis University, Waltham, Mass., for an assistant in a study of asymmetry in reactions of molecules of type C, a, b, d, d, with asymmetric reagents, $750.

(2) To Charles Gainor, Associate Professor of Bacteriology, University of Pittsburgh, Pittsburgh, Pa., for an assistant and supplies for a study of morphologic, cytologic, and biochemical aspects of vibrioid-like bacterium, $880.

(3) To Frank H. Healey, Assistant Professor of Chemistry, Lehigh University, Bethlehem, Pa., for apparatus for a study of contact potentials of metals in organic vapors, $775.

(4) To Charles B. Heiser, Associate Professor, Indiana University, Botany Department, Bloomington, Ind., for an assistant in genetic and taxonomic studies of chili peppers with particular reference to *Capsicum baccatum*, $750.

(5) To Benedict Jaskoski, Assistant Professor of Biology, Loyola University, Chicago, Ill., for an assistant and other expenses in a study of growth requirements of some ascarid larvae, $750.

(6) To Charles R. McGimsey, Staff member, Peabody Museum, Harvard University, Balboa Heights, Canal Zone, for assistants and other expenses in an archeological investigation of preceramic inhabitants of Panama, $1,500.

(7) To Robert H. Maybury, Assistant Professor, University of Redlands, Redlands, Calif., for equipment for an investigation of intramolecular linkages of proteins dissolved in heavy water, $1,500.

(8) To Charles G. Shaw, Associate Professor and Associate Plant Pathologist, State College of Washington, Pullman, Wash., for travel expense for study of the parasitic fungi of Pacific Northwest, $846.

(9) To Bradford Washburn, Director, Museum of Science, Science Park, Boston, Mass., for publication of Mount McKinley map project, $2,000.

The Committee, charged with the duty of recommending to the Council recipients for the Academy Research Grants in New England, which the Academy distributes for the American Association for the Advancement of Science, recommended one grant of $225 to Dorrit Hoffleit, Radcliffe College, Cambridge, Mass., for clerical assistance in the preparation of results of recent variable star research for publication. This was also approved by the Council at its meeting on 5 October 1955.

On 6 March 1956, the Committee reviewed fifty-four applications for grants totaling $61,972.67 and recommended to the Council eighteen grants totaling $12,635 from the Permanent Science Fund. These were approved by the Council at its meeting on 14 March 1956, as follows:

Grants Approved 14 March 1956

(1) To William C. Boyd, Professor of Immunochemistry, Boston University, Boston, Mass., toward the purchase of a Friden automatic square root calculating machine for a comparison and evaluation of methods of gene frequency calculation, and derivation and calculation of variances, $700.

(2) To Charles C. Davis, Associate Professor of Biology, Western Reserve University, Cleveland, Ohio, for equipment to study the seasonal distribution and productivity of the phytoplankton and the zooplankton in the Toronto region of Lake Ontario, $500.

(3) To R. B. Escue, Professor of Chemistry, North Texas State College, Denton, Texas, for cinematographic equipment for a study of the effects of specific substances upon melanin-containing cells, $1,000.

(4) To Sergei Gaposchkin, Harvard College Observatory, Cambridge, Mass., for an assistant in the study of morphologic properties of selected variable stars and their relations to the structure of our galactic system, $700.

(5) To Andreas Granitsas, Instructor of Physiology, Athens University, Athens Goudi, Greece, for equipment and supplies for a study of hormonal and nutritional interrelationships, $1,000.

(6) To Charles Willard Hart, Jr., Randolph-Macon Woman's College, Lynchburg, Va., for an assistant in the study of the structure and function of the statocyst of the crayfish, $300.

(7) To Arthur Grover Humes, Professor of Biology, Boston University, Boston, Mass., for an assistant in the study of the Copepoda (Crustacea) of Africa and Madagascar, $500.

(8) To Donald G. Humphrey, Asst. Professor of Science, Oregon College of Education, Monmouth, Ore., for equipment and travel expense in chromosome studies of the Northwest ambystomid salamanders, $700.

(9) To Willis H. Johnson, Professor of Zoology, Wabash College, Crawfordsville, Ind., for an assistant in a study of sterile culture and regeneration in *Planaria*, $1,000.

(10) To Helen B. Jordan, University of Georgia, Atlanta, Ga., toward costs of equipment, travel, and an assistant in a study of the transmission of saurian malaria, $500.

(11) To Paul D. Keener, Assistant Professor of Plant Pathology, University of Arizona, Tucson, Ariz., for field trip expenses in the

compilation of the fungi of Arizona with special reference to diseases of forest trees, $750.

(12) To Margaret Ward Lasker, 64 Shelley Avenue, Yonkers, N. Y., for an assistant in a study of the inheritance and distribution of a rare metabolic anomaly – essential pentosuria – in human populations, $350.

(13) To Daniel A. Livingstone, Assistant Professor of Zoology, University of Maryland, College Park, Md., for an assistant and equipment for a study of late-Pleistocene pollen stratigraphy of the land and sea in eastern North America, $1,000.

(14) To Richard Jewett Lougee, Professor of Geomorphology, Graduate School of Geography, Clark University, Worcester, Mass., for materials and travel expense in an investigation and measurement of crustal upwarping in the St. Lawrence Valley, $1,000.

(15) To X. J. Musacchia, Associate Professor of Biology, St. Louis University, St. Louis, Mo., for equipment and travel expenses in a study of tissue lipids of some temperate zone fishes, $500.

(16) To Betty Mack Twarog, Public Health Service Research Fellow, Harvard University, Cambridge, Mass., for recording equipment in a study of neurohormones in invertebrate smooth muscle, $985.

(17) To Talbot H. Waterman, Associate Professor of Zoology, Yale University, New Haven, Conn., for an assistant for a study of visual physiology of deep water animals, $700.

(18) To Marlan Paul Willis, Assistant Professor of Psychology, Baylor University, Waco, Texas, one-half the cost, contingent upon appropriation of the other half by Baylor University, of equipment for a study of two-choice discrimination transfer as a function of drive-stimulus generalization, $450.

One grant totaling $175 from the Academy Research Grants in New England of the American Association for the Advancement of Science was made to Robert B. Channell, Botanist, Gray Herbarium of Harvard University, Cambridge, Mass., for plates for publication of a revisional study of the genus *Marshallia* (Compositae).

The grants approved by the Committee and the Council during the year totaled $22,886 from the Permanent Science Fund and $400 from Academy Research Grants of the American Association for the Advancement of Science.

HARLOW SHAPLEY, *Chairman*

Report of the Committee on Publication

The past year has been one of transition, with no less than three volumes of the *Proceedings* in simultaneous publication, which has doubtless thoroughly confused both Fellows and the librarians of subscribing institutions.

Volume 83 was concluded with Number 6, containing Professor F. H. Crawford's *Polyphase Polycomponent Chemical Systems,* which was Part II of his *Thermodynamic Relations in* n-*Variable Systems in Jacobian Form,* the first part of which had been published several years ago.

Volume 84 is reserved for Professor P. W. Bridgman's studies in high pressures, which are generously subsidized by the Rumford Committee. Number 1, containing two papers, appeared in July, and a manuscript for Number 2 is now in the printer's hands.

Volume 85, Number 1, containing a list of Fellows as of 1 January 1955, appeared at the time of the annual meeting in May, in a typographical form that is owed to Mr. Rudolph Ruzicka (IV:4), a member of this Committee. Publication of a 175th anniversary list of Fellows from 1780 to 1955, which was planned for Number 2, has been deferred (though not abandoned) for want of funds. The Editor and a few other heretics doubted the utility of printing a list of Fellows each year, but the Executive Officer so eloquently pleaded the administrative utility of doing so that the opposition melted. Such a list is now in proof and will shortly appear as Volume 85, Number 2.

The first number of *Dædalus* (Volume 86, Number 1) appeared in May, 1955, and attracted a favorable response from widely scattered Fellows in various fields. A second issue has been stalled in proof stage for many months, chiefly because the Editor's telephone rings with too distressing frequency, while material for a third is on hand. As the Council has generously increased the funds of the Publication Committee to permit the appearance of *Dædalus* at more frequent intervals, the Editor has engaged Mrs. W. H. Harrison of Harvard, Mass., to act as Managing Editor, beginning with Number 3. With the assistance of Mrs. Harrison, who, working on an hourly basis, will take over the preparation of copy and all details of seeing numbers through the press, more regular publication will be possible in the future.

In January, as a contribution to the Franklin 250th Anniversary, the Academy published in an edition of 500 copies *The New-England*

Courant. A Selection of Certain Issues Containing Writings of Benjamin Franklin Or Published by Him During His Brother's Imprisonment, with an introduction by Perry Miller. As the *Courant* was the most significant enterprise of Franklin's early years in Boston, it seemed appropriate that the Academy's permanent printed contribution to the 1956 anniversary should be a reproduction of selected issues of the newspaper. The Committee is grateful to the Massachusetts Historical Society for permission to reproduce their unique file, and to the Meriden Gravure Company and the Stinehour Press for the admirable collotype reproduction and typography that make the volume a suitable tribute to an able printer.

Early Slavic Civilization, by Francis Dvornik, the second in the *Survey of Slavic Civilization* series published by the Academy for the Committee for the Promotion of Advanced Slavic Cultural Studies in co-operation with the Department of Slavic Languages and Literatures of Harvard University, is about to appear. Corrected page proofs were returned to the Harvard University Printing Office in January, with hope of early May publication, which has not yet materialized.

The Committee has accepted for publication as a Memoir a manuscript by the late Dr. John Peabody Monks, physician in the Department of Hygiene, Harvard University, concerning the war experience of Grant Study students. The expense of editorial preparation, which is being done by Miss Isabel Garvey, and of printing, will be contributed to the Academy by outside sources. The Committee considered it wise to revive the Memoir Series in order to provide for the publication of material that was too long to appear in *Dædalus*. Mr. Ruzicka will assist in developing a format that will return in spirit to the early volumes of the Memoir Series and will avoid the awkwardness of more recent volumes.

WALTER MUIR WHITEHILL, *Editor*

Report of the Rumford Committee

The committee met at numerous times during the year to consider applications to the Rumford Fund and to transact other business which came before it. It received six applications for research grants and recommended three of these to the Council, as follows:

To Albert P. Linnell of Amherst College, Amherst, Mass., to make photometric measurements of several eclipsing binary stars at the Stewart Observatory, Tucson, Ariz., $865.

To Bart J. Bok, of the Harvard College Observatory, Cambridge, Mass., for assistance in a study of the 21-centimeter profiles in and near discrete radio sources, $1,500.

To Gerhard R. Miczaika, of the Harvard College Observatory, Cambridge, Mass., for an investigation of infrared sensitive detectors, $900.

In regard to grants, the committee spent a great deal of its time trying to formulate a policy to guide it in making good use of the Rumford Fund. We have been worried all year by the lack of applications for this Fund and hope that in the coming year we can stimulate more interest from worthy applicants in the field of heat and light.

The committee recommended to the Council the placement of $13,180.71 of the unexpended income of the Rumford Fund into the principal of the account. The principal now stands at $100,000. Other financial activity of the committee included the payment of $2,530.05 for the publication of the Bridgman Papers; $782.70 for legal expenses in connection with bringing the petitions of the Academy concerning the Rumford Fund trust to the Massachusetts Supreme Court; publication of the James Franck Rumford Lecture, $834.70; and miscellaneous expenses of $384.99.

We were disturbed that the original Grant of Arms given to Count Rumford by George III was deteriorating and we undertook to have the parchment properly protected and mounted in a permanent display frame with a storage cover.

The Rumford model exhibit which was constructed under the auspices of this committee for the Rumford Bicentennial Celebration was loaned out twice during the year. Since there seems to be no record of the times and places where this exhibit has been shown, we include a summary in our report this year. The exhibit was originally shown during March and April, 1953, at the old 28 Newbury Street home of the Academy. During June and July of 1953 it was shown in the Building 7 Lobby of M.I.T., and during October and November of that year the model exhibit was on loan to the Baker Library of Dartmouth College. In January and February of 1954 the models were on exhibit in the David Library of Phillips Exeter Academy and then for a short time in April, 1954, they were shown at the State Teachers' College at New Paltz, N. Y. In February, 1955, the exhibit was at Swarthmore College, in Swarthmore, Pa., and during March and April of that year it was in the exhibit cases of the Staten Island Institute of Arts and Sciences on Staten Island, N. Y.

During January and February, 1956, the exhibit was displayed in Allston Burr Hall at Harvard University, Cambridge, Mass., and since April the exhibit has been at the Linda Hall Library in Kansas City, Mo.

SANBORN C. BROWN, *Chairman*

Report of the Cyrus M. Warren Fund Committee

During the year 1955-56 no suitable applications were received and no grants from the Fund were recommended. The income has been allowed to accumulate. A study is being made of the new policy inaugurated last year to aid the training of chemistry teachers and potential chemists, particularly through the smaller colleges.

WALTER G. WHITMAN, *Chairman*